

DOCUMENT RESUME

ED 281 068

CE 047 049

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TITLE The Numeracy Pack. Books 1-4.
INSTITUTION Adult Literacy and Basic Skills Unit, London
(England).
REPORT NO ISBN-0-906509-53-X
PUB DATE 84
NOTE 171p.
PUB TYPE Guides - Classroom Use - Materials (For Learner)
(051)

EDRS PRICE MF01/PC07 Plus Postage.
DESCRIPTORS Addition; *Adult Basic Education; *Arithmetic;
Decimal Fractions; Division; Foreign Countries;
Fractions; Mathematics Instruction; *Mathematics
Skills; Measurement; Multiplication; Percentage;
Place Value; Subtraction
IDENTIFIERS Money Skills; *Numeracy; Time Telling

ABSTRACT

These four books are intended for use by individuals who need numeracy instruction as well as by those who help such individuals. Explanations are offered of how to do a large variety of calculations; different methods of getting the right answer are also provided. Book 1 focuses on numbers, how they are written, what they mean, how they are organized, counting, addition, subtraction, multiplication, division, and place value. Book 2 provides more advanced work on addition, subtraction, multiplication, and division. Topics covered in Book 3 include fractions, decimals, and percentages. Book 4 deals with measurement of time and distance, money, the metric system, and using a calculator. The books contain a mix of informative material and problems and exercises. (YLB)

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The Numeracy Pack

Diana Coben and Sandy Black

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ALBSU
Adult Literacy & Basic Skills Unit

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The Numeracy Pack

Diana Coben and Sandy Black

"I can add but I can't take away."

"I don't really know my tables."

"What is the metric system?"

"I was never any good at maths at school."

"Decimals? You mean money?"

"My wife does all the figuring out."

"I've got a calculator but I don't know how to use it."

If you recognise yourself in any of these quotes, or if you want to help someone who finds maths a struggle - this is the Pack for you.

The Numeracy Pack consists of four books:

1. Numbers . . . how they're written; what they mean; how they're organised
2. The Four Rules of Number . . . $+$ $-$ $\times$ $\div$
3. Fractions, decimals and percentages
4. Measurement . . . of time, distance, etc., money; using a calculator.

There are explanations of how to do calculations you may have forgotten, never understood - or never heard of. Since there is often more than one way of getting a right answer, we've included different methods.

Finally, the back cover of this wallet may give you food for thought on the vexed question of CHEATING . . .



The Numeracy Pack

Diana Coben and Sandy Black

Book 1

ALBSU
Adult Literacy & Basic Skills Unit

How Many?	1	Add or Multiply?	14
How Many?	2	Fill in the Missing Signs to Make the Sum Right $+$ $-$ $\times$ $\div$	14
Writing Numbers	3	Which Sign?	15
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Write the Name of the Sign in Each of these Sums	13	Numbers	28
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How Many?

How many people are there in the room?

How many are women?

How many are men?

Are there any children in the room?

How many tables are there in the room?

How many chairs are there?

How many windows are there in the room?

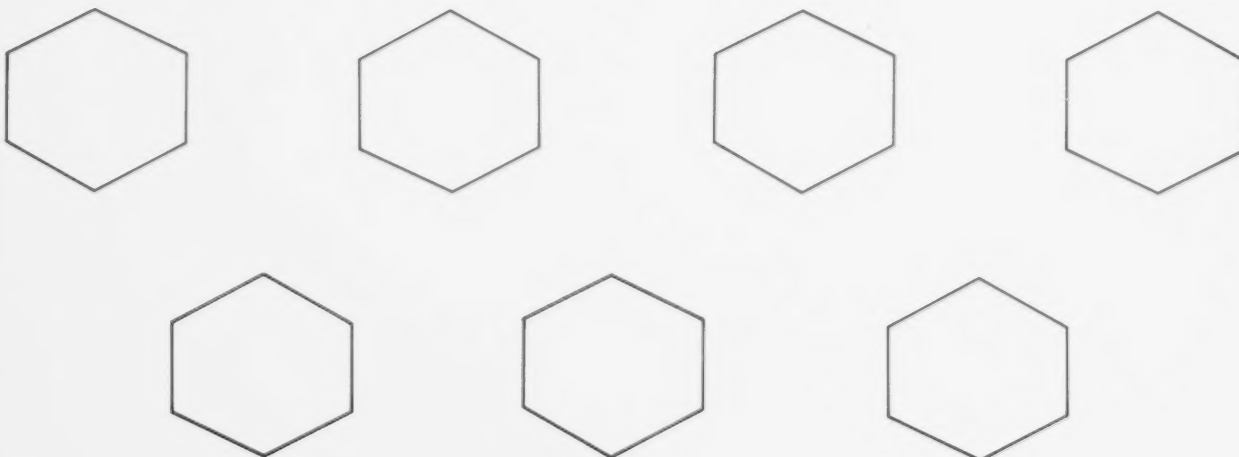
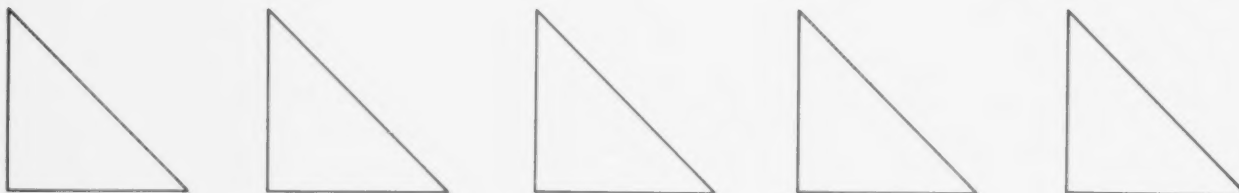
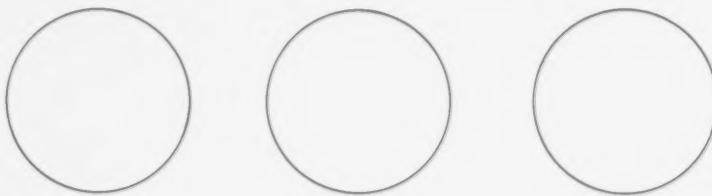
How many doors are there?

How many books are there on your table?

How many pens are there on your table?

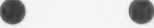
How many pencils are there on your table?

How many pages in your book have been written in?

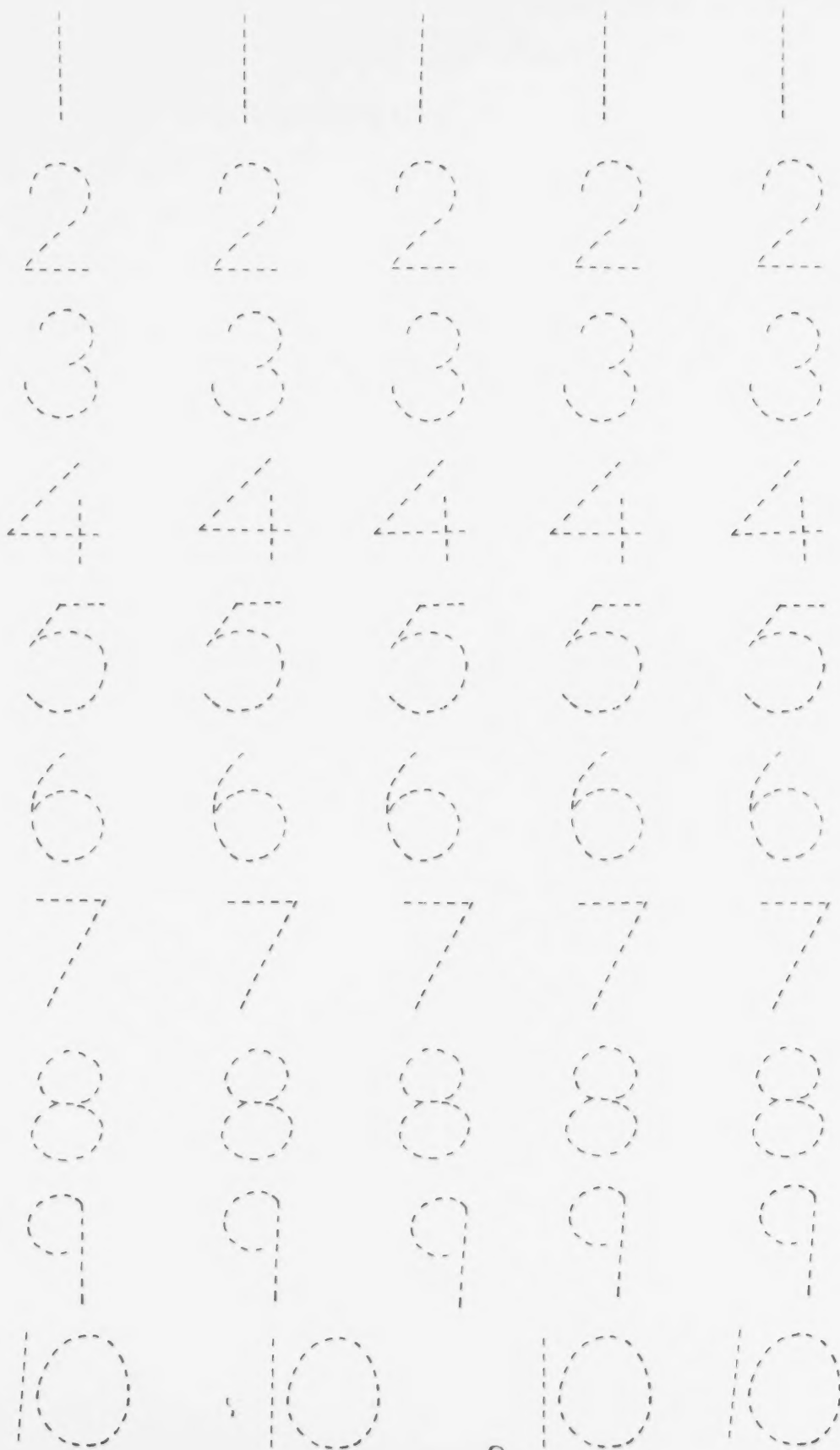


What are these shapes called?

How Many?

Count the Dots	Write the Number	Write the Word
		
		
		
		
		
		
		
		
		
		

Writing Numbers



Counting in 2's

2	two
4	four
6	six
8	eight
10	ten
12	twelve
14	fourteen
16	sixteen
18	eighteen
20	twenty
22	twenty-two
24	twenty-four
26	twenty-six
28	twenty-eight
30	thirty
32	thirty-two
34	thirty-four
36	thirty-six
38	thirty-eight
40	forty

Counting in 5's

5	five
10	ten
15	fifteen
20	twenty
25	twenty-five
30	thirty
35	thirty-five
40	forty
45	forty-five
50	fifty
55	fifty-five
60	sixty
65	sixty-five
70	seventy
75	seventy-five
80	eighty
85	eighty-five
90	ninety
95	ninety-five
100	one hundred

Counting in 10's

10	ten
20	twenty
30	thirty
40	forty
50	fifty
60	sixty
70	seventy
80	eighty
90	ninety
100	one hundred
110	one hundred and ten
120	one hundred and twenty
130	one hundred and thirty
140	one hundred and forty
150	one hundred and fifty
160	one hundred and sixty
170	one hundred and seventy
180	one hundred and eighty
190	one hundred and ninety
200	two hundred

Writing the Numbers 1 to 20

1	one
2	two
3	three
4	four
5	five
6	six
7	seven
8	eight
9	nine
10	ten
11	eleven
12	twelve
13	thirteen
14	fourteen
15	fifteen
16	sixteen
17	seventeen
18	eighteen
19	nineteen
20	twenty

Writing the Numbers 20 to 100

21	Twenty-one
22	Twenty-two
23	Twenty-three
24	Twenty-four
25	Twenty-five
26	Twenty-six
27	Twenty-seven
28	Twenty-eight
29	Twenty-nine
30	Thirty
31	Thirty-one
32	Thirty-two
33	Thirty-three
34	Thirty-four
35	Thirty-five
36	Thirty-six
37	Thirty-seven
38	Thirty-eight
39	Thirty-nine
40	Forty
50	Fifty
60	Sixty
70	Seventy
80	Eighty
90	Ninety
100	One hundred

Writing Large Numbers

100	One hundred
110	One hundred and ten
120	One hundred and twenty
1 000	One thousand
1 100	One thousand one hundred
1 110	One thousand one hundred and ten
10 000	Ten thousand
20 000	Twenty thousand
100 000	One hundred thousand
110 000	One hundred and ten thousand
100 111	One hundred thousand one hundred and eleven
1 000 000	One million

Large numbers are sometimes written with commas rather than gaps, for example 1,000,000 rather than 1 000 000. Either way, you count three figures in from the right-hand (units) end of the number and put a comma, or leave a gap. It is more up-to-date to leave a gap.

Ordinal Numbers

1st	First	16th	Sixteenth
2nd	Second	17th	Seventeenth
3rd	Third	18th	Eighteenth
4th	Fourth	19th	Nineteenth
5th	Fifth	20th	Twentieth
6th	Sixth	21st	Twenty-first
7th	Seventh	22nd	Twenty-second
8th	Eighth	23rd	Twenty-third
9th	Ninth	24th	Twenty-fourth
10th	Tenth	25th	Twenty-fifth
11th	Eleventh	26th	Twenty-sixth
12th	Twelfth	27th	Twenty-seventh
13th	Thirteenth	28th	Twenty-eighth
14th	Fourteenth	29th	Twenty-ninth
15th	Fifteenth	30th	Thirtieth
		31st	Thirty-first

The Signs

THE SIGN	IT SAYS	IT MEANS
+	Plus	Add
-	Minus	Take away
×	Multiplied by	Multiply
÷	Divided by	Divide
=	Equals	Is the same as

See the difference:

$$4 + 2 = 6$$

$$4 - 2 = 2$$

$$4 \times 2 = 8$$

$$4 \div 2 = 2$$

$$12 + 3 = 15$$

$$12 - 3 = 9$$

$$12 \times 3 = 36$$

$$12 \div 3 = 4$$

Try these:

Fill in the numbers:

$$20 + 4 =$$

$$20 - 4 =$$

$$20 \times 4 =$$

$$20 \div 4 =$$

Fill in the signs and the numbers:

$$9 \quad 3 =$$

$$9 \quad 3 =$$

$$9 \quad 3 =$$

$$9 \quad 3 =$$

$$10 \quad 5 =$$

$$10 \quad 5 =$$

$$10 \quad 5 =$$

$$10 \quad 5 =$$

Talking About Sums

+ Add Plus and	- Take away Minus Subtract less	× Multiply Times of	÷ Divide share	= Equals comes to
--------------------------------	--	-------------------------------------	-----------------------------	--------------------------------

There are lots of different ways of saying sums:

1. Add $6 + 7 = 13$

$$\begin{array}{r} 6 + \\ 7 \\ \hline 13 \end{array}$$

It says 6 add 7 equals 13
 or 6 plus 7 equals 13
 or 6 added to 7 equals 13
 or 6 and 7 equals 13
 or 6 and 7 makes 13
 or 6 and 7 is 13
 or 6 and 7 are 13

2. Take away $10 - 6 = 4$

$$\begin{array}{r} 10 - \\ 6 \\ \hline 4 \end{array}$$

It says 10 take away 6 equals 4
 or 10 take away 6 leaves 4
 or 10 minus 6 equals 4
 or 10 minus 6 leaves 4
 or 10 subtract 6 equals 4
 or 10 subtract 6 leaves 4

Talking About Sums

$$\begin{array}{r} 10 - \\ 6 \\ \hline 4 \end{array}$$

$$10 - 6 = 4$$

It says 6 from 10 leaves 4
or 6 taken from 10 leaves 4
or 6 subtracted from 10 leaves 4

3. **Multiply** $3 \times 4 = 12$

$$\begin{array}{r} 3 \times \\ 4 \\ \hline 12 \end{array}$$

It says 3 multiplied by 4 equals 12
or 3 times 4 equals 12
or 3 times 4 is 12
or 3 times 4 makes 12
or 3 fours are 12
or 3 fours make 12

4. **Divide** $15 \div 3 = 5$

It says 15 divided by 3 equals 5
or 15 divided by 3 is 5

$$\begin{array}{r} 5 \\ 3 \overline{) 15} \end{array}$$

3 divided into 15 equals 5
or 3 into 15 equals 5
or 3 into 15 goes 5 times
or Three into 15 goes 5 times
or Three into 15 is 5

Write these as sums:

1. 6 and 6 makes 12
2. 15 take away 5 leaves 10
3. 18 divided by 6 equals 3
4. 9 minus 4 equals 5
5. 3 times 5 equals 15
6. 5 fives are 25
7. 7 plus 6 makes 13
8. 6 into 18 goes 3 times
9. Fours into 20 is 5
10. 5 multiplied by 6 makes 30
11. 5 from 10 leaves 5
12. 9 from 16 leaves 7

Add and Take Away

Take 5 counters, and add to them another 4. How many in all? We write an **add** sum to show what we have done.

$$5 + 4 = 9$$

five add four makes nine

(We get the same answer if we start with 4 and add 5. Try it). Now start with 9 counters and take away five. How many are left? We write a **take away** or **subtract** sum to show this

$$9 - 5 = 4$$

nine take away five leaves four

Start again with 9 counters and this time take away 4. How many are left? We write

$$9 - 4 = 5$$

nine take away four leaves five

So adding and taking away go together like this:

$$5 + 4 = 9$$

$$9 - 5 = 4$$

$$9 - 4 = 5$$

In the same way, take any other groups of counters. Take 12 and add 7 to make 19

$$12 + 7 = 19$$

Start with 19 and take away 12. How many left?

$$19 - 12 = 7$$

Start with 19 and take away 7. How many left?

$$19 - 7 = 12$$

Look at these:

$$2 + 3 = 5$$

$$5 - 2 = 3$$

$$5 - 3 = 2$$

$$15 + 10 = 25$$

$$25 - 10 = 15$$

$$25 - 15 = 10$$

$$8 + 9 = 17$$

$$17 - 9 = 8$$

$$17 - 8 = 9$$

Complete these:

$$8 + 3 = 11$$

$$11 - 8 =$$

$$11 - 3 =$$

$$14 + 4 = 18$$

$$18 - 4 =$$

$$18 - 14 =$$

$$10 + 11 = 21$$

$$21 - 10 =$$

$$21 - 11 =$$

$$16 + 8 = 24$$

$$24 - 8 =$$

$$24 - 16 =$$

Write 2 take away sums from each of these add sums. Use counters to help:

$$4 + 6$$

$$13 + 15$$

$$3 + 11$$

$$3 + 8$$

$$12 + 9$$

$$21 + 4$$

$$7 + 16$$

$$5 + 14$$

*Write these Sentences Using Figures, and the
Signs $+$ $-$ $\times$ $\div$ $=$ Instead of Words*

Four plus two makes six

Three eights are twenty-four

Twenty-three minus seven leaves sixteen

Thirty-six divided by nine is four

Eighteen added to thirty makes forty-eight

A hundred and forty-four equals twelve
times twelve

Seventeen plus six take away three makes
twenty

Write these Sums in Words only

$$28 \div 4 = 7$$

$$12 \times 12 = 144$$

$$150 - 25 = 125$$

$$6 = 2 \times 3$$

$$327 + 16 = 343$$

$$2 \times 4 \times 6 = 48$$

$$9 \times 18 = 162$$

$$120 = 12 \times 10$$

$$54 + 6 - 3 = 57$$

**Write the Name of the
Sign in Each of these Sums**

$8 + 4$

$16 \div 8$

3×6

$44 \div 11$

$18 - 6$

$17 + 22$

$13 - 5$

9×7

$16 + 27$

$36 - 20$

$14 \div 2$

$16 - 7$

$2 + 19$

$33 + 8$

**Write the Sign $+$ $-$ $\times$
or $\div$ Next to
Each of these Sums**

Fifteen divided by three

Eight plus twelve

24 divided by 6

12 times 9

4 multiplied by 5

21 take away 13

102 added to 316

56 subtracted from 100

12 plus 8 plus 16

20 times 6

15 add 36

2 times 2 times 2

72 minus 24

18 divided by 2

100 shared into 10 parts

Add or Multiply?

+ Plus or add

× Multiply

Put in the missing sign:

example: $5 + 9 = 14$

$3 \quad 5 = 15$

$2 \quad 6 = 8$

$9 \quad 2 = 18$

$3 \quad 4 = 12$

$7 \quad 2 = 14$

$16 \quad 4 = 12$

$2 \quad 10 = 20$

$4 \quad 6 = 24$

$2 \quad 8 = 16$

$7 \quad 4 = 28$

$7 \quad 8 = 56$

$6 \quad 5 = 30$

$48 \quad 2 = 50$

$3 \quad 7 = 21$

$9 \quad 3 = 27$

$6 \quad 7 = 42$

$9 \quad 9 = 81$

$5 \quad 6 = 11$

$3 \quad 3 = 9$

Fill in the Missing Signs to Make the Sum Right

+ - × ÷

example: $3 \times 3 = 9$

$6 \quad 7 = 13$

$18 \quad 2 = 9$

$100 \quad 10 = 10$

$17 \quad 5 = 12$

$9 \quad 9 = 81$

$21 \quad 8 = 13$

$4 \quad 5 = 20$

$39 \quad 6 = 45$

$158 \quad 16 = 142$

$15 \quad 4 = 60$

$120 \quad 60 = 60$

$24 \quad 6 = 4$

$12 \quad 3 = 36$

$4 \quad 2 = 2$

$16 \quad 4 = 4$

$13 \quad 25 = 38$

$125 \quad 25 = 5$

$6 \quad 12 \quad 3 = 21$

$10 \quad 5 \quad 3 = 12$

$19 \quad 2 \quad 2 \quad 2 = 8$

Which Sign?

Put a ring round the correct sum to match the words on the left hand side

1. 2lb potatoes at 7p lb.

$2 + 7$

2×7

$7 \div 2$

$7 - 2$

$7 + 7$

$2 + 2$

2. Jim is 9 today. How old will he be in 8 years time?

9×8

$9 \div 8$

$9 - 8$

$9 + 9$

$9 + 8$

$8 + 8$

3. My fare for work is 26p a day. How much is this for a 5-day week?

5×13

$26 + 5$

$13 + 13$

26×5

26×5

$5 \div 26$

4. We are walking on a 23-mile hike to Wike. The signpost says "WIKI 16 miles". How far have we travelled?

16×23

$23 + 16$

$16 - 23$

23×16

$23 \div 16$

$23 - 16$

5. A block of flats has 14 floors. There are 84 flats altogether. How many on each floor?

$84 + 14$

$14 - 84$

84×14

$84 \div 14$

$84 - 14$

$14 \div 84$

6. John's uncle is 41. He is 22 years older than John. How old is John?

22×41

$22 - 41$

$41 - 22$

41×22

$41 - 19$

$41 \div 22$

7. Jean has 24 records in her collection. Last week she lost 5 of them. How many has she left?

$5 + 24$

24×5

$24 - 5$

$24 \div 5$

$29 - 5$

$5 - 24$

8. There are 6 squares in a bar of chocolate. How many squares in 8 bars?

$8 + 6$

$14 - 6$

$8 \div 6$

$6 + 8$

14×6

6×8

The Number Square

The number square can be used in a variety of ways, as a counting square, as a multiplication square and as an aid to the understanding of factors.

1. As a counting square: fill in the numbers 1 to 10 from left to right along the top line of squares. Carry on from left to right in the next row, and so on until the square is full of numbers. You could then shade every second number or every fifth and so on as a preparation for multiplication.

2. As a multiplication square: fill in the numbers 1 to 10 from left to right along the top line of squares. Now write the numbers 2 to 10 down the left hand side of the square. Then work along one line at a time, saying $2 \times 1 = 2$, $2 \times 2 = 4$, $2 \times 3 = 6$ and so on, like this:

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12				
3	6	9	12						
4	8	12							
5	10	15							
6	12								
7	14								
8	16								
9	18								
10	20								

Work through each line until the square is full. You will find you've got a handy square on which to check your tables. You will probably also find that you know more of your tables than you thought.

3. Factors: Look at the multiplication square. Pick a number and see how many times you can find the same number in the square.

For example, 36

$$36 = 6 \times 6$$

$$36 = 4 \times 9$$

$$36 = 9 \times 4$$

Prime Factors: take one set of factors, for example:

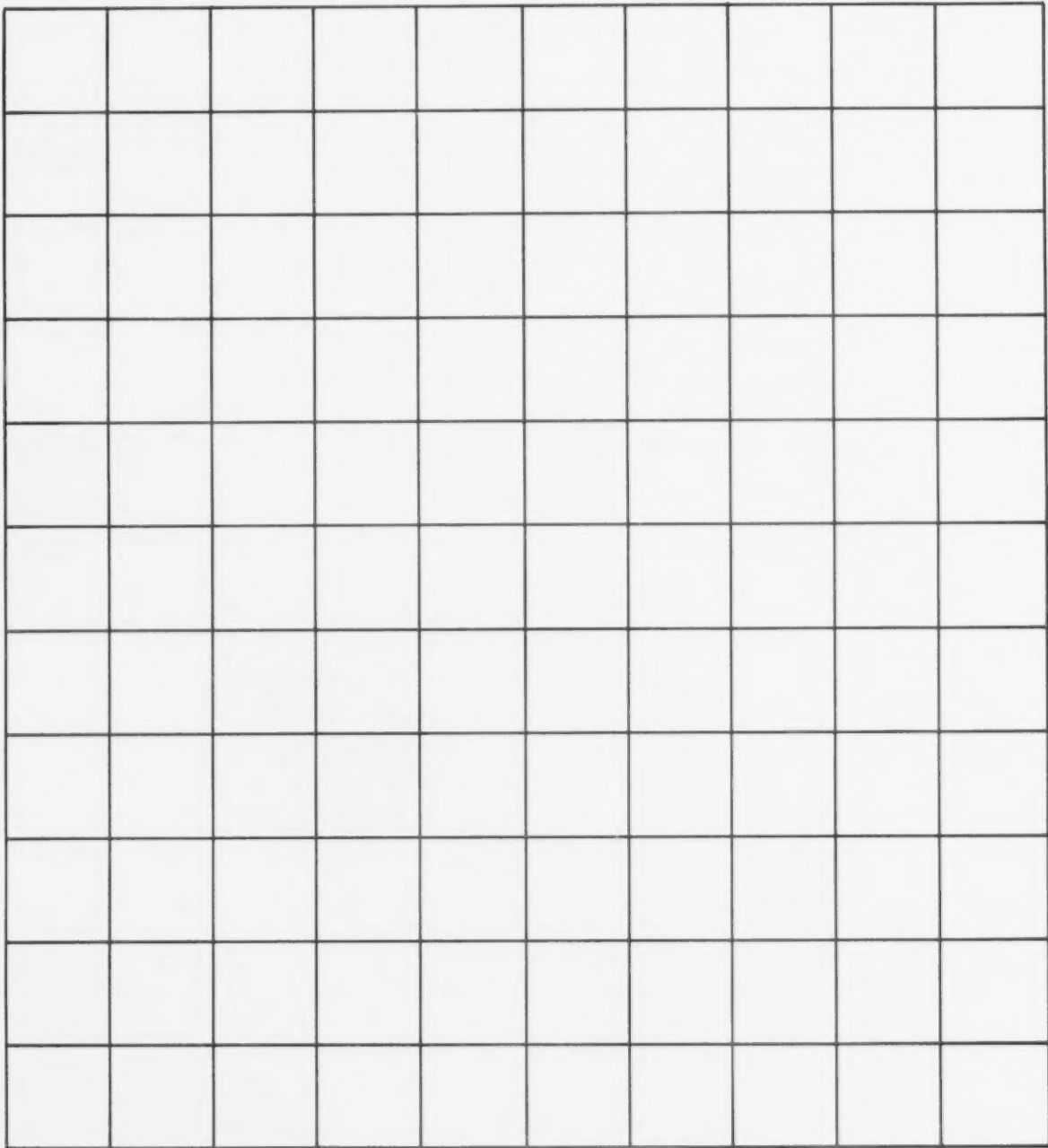
$$4 \times 9$$

and find the factors of each number.

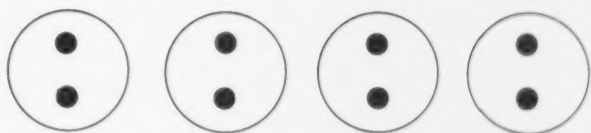
In this case $4 = 2 \times 2$ and $9 = 3 \times 3$

so we could write, $36 = 2 \times 2 \times 3 \times 3$

The Number Square



Add and Multiply



4 groups of 2

How many in all?

We write this $2 + 2 + 2 + 2 = 8$ (add)

or this $4 \times 2 = 8$ (multiply)

Multiplying is the same as adding equal groups



5 groups of 3

How many in all?

We write this $5 \times 3 = 15$

or this $3 + 3 + 3 + 3 + 3 = 15$

Multiplying is quicker, and easier to write

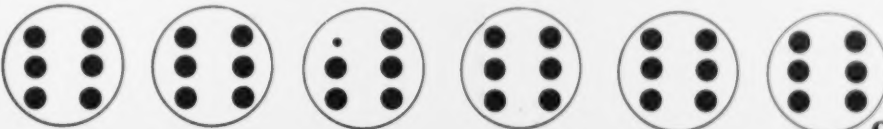
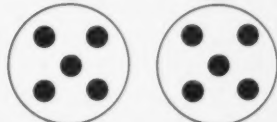
Write add and multiply sums for these:



5 groups of 4



6 groups of 2



Add and Multiply Using Counters

1. You have 15 counters. Share them into 3 equal groups. How many in each group? Draw the groups. Write an addition (+) sum to show how you have divided the 15 counters. Write a multiplication (×) sum which shows the same thing.

Now divide the 15 counters into equal groups of a different size. How many in each group? Draw the groups. Write addition (+) and multiplication (×) sums to show how you have divided the counters this time.

2. Starting with 20 counters, find 2 different ways of sharing them into groups of equal size. For each way, draw the groups, and write an addition (+) and a multiplication (×) sum to show what you have done.
3. Starting with 24 counters, find 3 different ways of sharing them into groups of equal size. For each way, draw the groups, and write an addition (+) sum and a multiplication × sum to show what you have done.

Write the Multiplication Sums that Match the Addition Sums on the Left Hand Side

ADD +	MULTIPLY ×	ADD +	MULTIPLY ×
$\begin{array}{r} 3 + \\ 3 \\ 3 \\ \hline \end{array}$	$\begin{array}{r} 3 \times \\ 3 \\ \hline \end{array}$	$\begin{array}{r} 6 + \\ 6 \\ \hline \end{array}$	
$\begin{array}{r} 4 + \\ 4 \\ 4 \\ 4 \\ \hline \end{array}$		$\begin{array}{r} 7 + \\ 7 \\ 7 \\ \hline \end{array}$	
$\begin{array}{r} 5 + \\ 5 \\ 5 \\ \hline \end{array}$			24

Turning the Tables



Imagine a bar of chocolate like this. There are twelve pieces altogether, but we can break it up in different ways.



If we break it this way we have 4 lots of 3 pieces.

$$4 \times 3 = 12$$



If we break it this way, we have 3 lots of 4 pieces

$$3 \times 4 = 12$$

We have turned the sum around, but still have the same number of pieces. Now try the same thing with these groups of squares: split them up in 2 different ways which turn the tables round. Write the sum underneath.

4 lots of 2



2 lots of 4



5 lots of 3



3 lots of 5



4 lots of 5



5 lots of 4



Multiplying is Quicker than Adding and Shorter to Write

$\times$	$+$
$1 \times 3 = 3$	3
$2 \times 3 = 6$	$3 + 3 = 6$
$3 \times 3 = 9$	$3 + 3 + 3 = 9$
$4 \times 3 = 12$	$3 + 3 + 3 + 3 = 12$
$5 \times 3 = 15$	$3 + 3 + 3 + 3 + 3 = 15$
$6 \times 3 = 18$	$3 + 3 + 3 + 3 + 3 + 3 = 18$
$7 \times 3 = 21$	$3 + 3 + 3 + 3 + 3 + 3 + 3 = 21$
$8 \times 3 = 24$	$3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 24$
$9 \times 3 = 27$	$3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 27$
$10 \times 3 = 30$	$3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 30$
$11 \times 3 = 33$	$3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 33$
$12 \times 3 = 36$	$3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 36$

Write these as multiplication sums.

1. $5 + 5 + 5 + 5 = 20$
2. $7 + 7 + 7 + 7 + 7 = 35$
3. $8 + 8 + 8 = 24$
4. $9 + 9 + 9 + 9 + 9 + 9 + 9 = 63$
5. $2 + 2 + 2 + 2 + 2 + 2 = 12$
6. $6 + 6 = 12$
7. $4 + 4 + 4 + 4 = 16$
8. $12 + 12 + 12 + 12 + 12 + 12 = 72$
9. 3 sixes are eighteen
10. Five fours are twenty
11. Nine eights are seventy-two
12. Fifteen times ten makes a hundred and fifty

Multiply and Divide

When we **put together equal groups** we **multiply** them

3 groups of 4 make 12

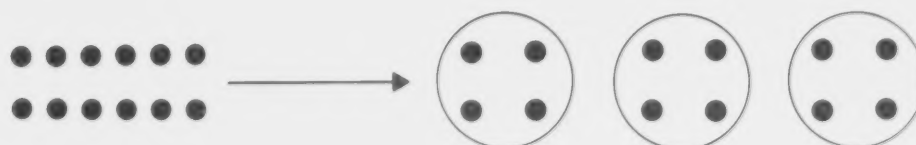


$$3 \times 4 = 12$$

Three times four equals twelve.

When we **split** something into **equal parts**, we **divide** it.

When 12 is divided into 3 equal groups, there are 4 in each group



So $12 \div 3 = 4$

12 divided by 3 equals 4

When 12 is divided into 4 equal parts, there are 3 in each group.



So $12 \div 4 = 3$

12 divided by 4 equals 3

Multiplying and dividing go together like this

$$4 \times 3 = 12$$

$$3 \times 4 = 12$$

$$12 \div 3 = 4$$

$$12 \div 4 = 3$$

or

$$\begin{array}{r} 4 \\ 3 \overline{)12} \end{array}$$

$$\begin{array}{r} 3 \\ 4 \overline{)12} \end{array}$$

Factors

What do we know about the number 12?

We know $3 \times 4 = 12$ and $12 \div 4 = 3$

$$12 \div 3 = 4$$

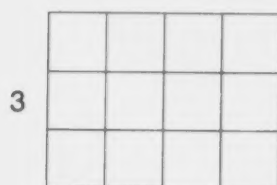
The numbers 3 and 4 are called factors of 12 because they divide into 12 a whole number of times.

We also know $2 \times 6 = 12$ and $12 \div 6 = 2$

$$12 \div 2 = 6$$

The numbers 2 and 6 are also factors of 12

How many ways are there of splitting 12 into factors? Let's look at the number of ways of drawing a block of 12 squares.



3

$$12 = 3 \times 4 \text{ OR}$$



4

$$12 = 4 \times 3$$

4

3



12

2



6

$$12 = 2 \times 6 \text{ OR}$$



6

$$12 = 6 \times 2$$

12

2

$$12 = 12 \times 1 \text{ OR}$$

1



$$12 = 1 \times 12$$

So the only factors of 12 are

1, 2, 3, 4 and 6 and 12 itself.

1

0

1

2

3

4

5

6

7

8

9

These are the figures that we use. There are only ten of them but we can make any number by putting them together in different ways.

The system that we use to do this is called "Place Value" because the figures have a value depending on where they are placed. For example, in the number 21 the figure 2 means two tens and the figure 1 means one unit. (Unit is another name for one).

In the number 635 the figure 6 means six hundred (H)
the figure 3 means three tens (T)
the figure 5 means five units (U)

To help you remember, you can put the letters H T U above the figures in the number.

H	T	U
6	3	5

Place Value is vitally important in arithmetic. If you put a figure in the wrong place — if you write 17 instead of 71 for instance, you can be in a lot of trouble. Imagine how you'd feel if you were expecting to be paid £71 for a week's work and you got £17 instead.

The important thing to remember is that any figure in the tens column is worth ten times what it would be worth in the Units column. Similarly, any figure in the Hundreds column is worth ten times what it would be worth in the Tens column and so on. There is no end to the system, you could go on writing the same figure, for instance 4, again and again, and each 4 would be worth ten times more than its neighbour to the right, and ten times less than its neighbour to the left.

[illegible]

Place Value also helps you to say large numbers, look at the number below

1 264 509

We say, one million, two hundred and sixty-four thousand, five hundred and nine.

Or, to put it another way, 1 million, 2 hundred thousands, 6 tens of thousands, 4 thousands, 5 hundreds, no tens and nine ones.

Try saying these numbers:

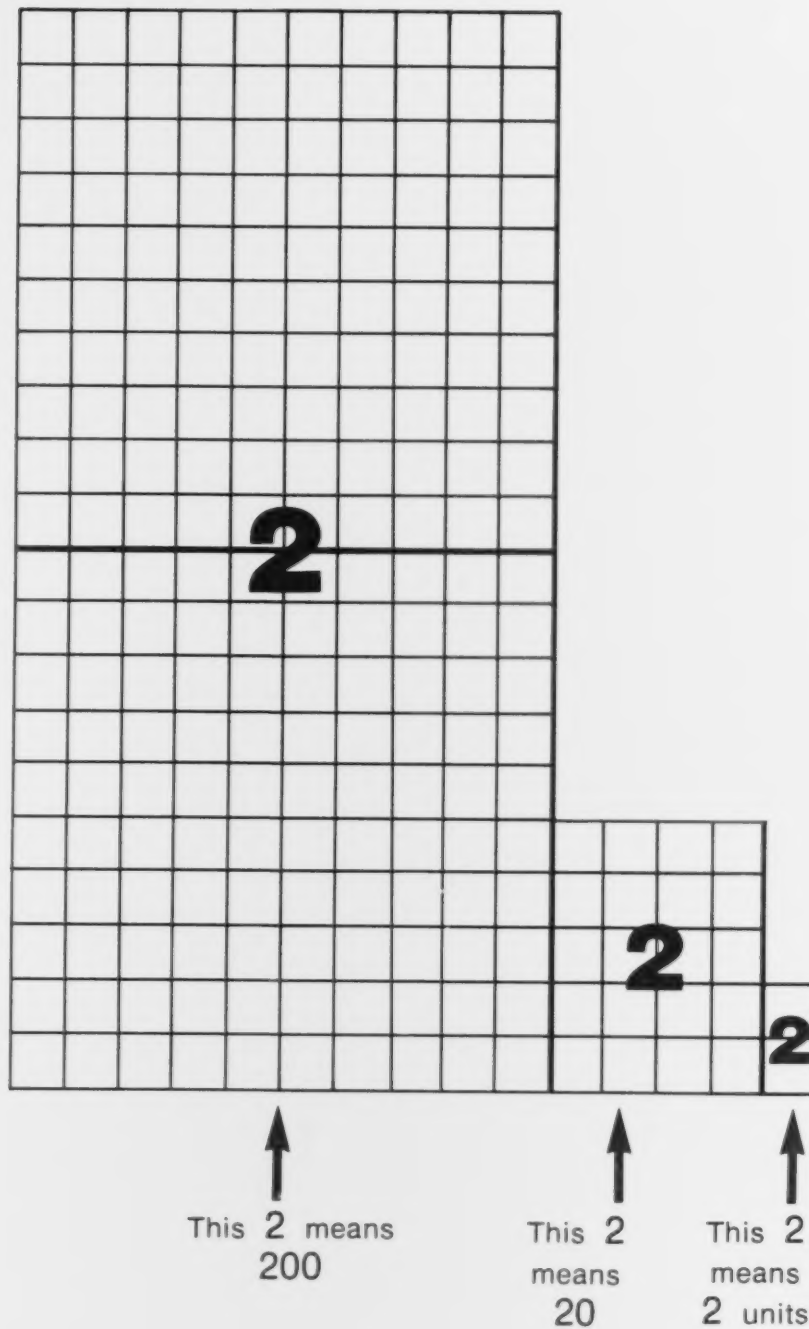
405
1 094

$$\begin{array}{r} 23\ 678 \\ 286 \end{array}$$

6 987 453
42 900

29

Place Value



Count the squares to check.

$$222 = 2 \text{ hundreds} + 2 \text{ tens} + 2 \text{ units}$$

We say: Two hundred and twenty-two.

Place Value

	Thousands	Hundreds	Tens	Units	
	TH	H	T	U	WRITE THE NUMBER IN WORDS
5 432	5	4	3	2	five thousand, four hundred and thirty-two
7 628					
594					
2 021					
1 101					
2 543					
6 871					
1 967					
2 005					
4 067					
11					
209					
3 063					
2 895					
6 042					
2 153					

U

$$10 \times 1 = 10$$



1 000 s THOUSANDS	100 s HUNDREDS	10 s TENS	1 s UNITS

2 in the units column has the value 2

Numbers

Put a circle round every odd number:

5 12 24 7 11 18 19 22 25

Draw a line under all the numbers that come after 3:

7 2 4 1 6 5

Put a circle round every even number:

2 9 24 8 31 15 78

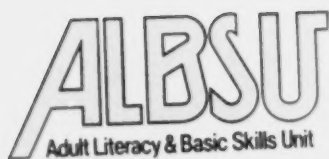
Put these numbers into order with the smallest number first:

8 6 9 1 3 7 5 10 4 2

Put these numbers into reverse order, with the largest number first:

19 50 14 7 5 24 19 37

Further copies available from:
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The Numeracy Pack

Diana Coben and Sandy Black

Book 2

ALBSU
Adult Literacy & Basic Skills Unit

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How Well Can You Add?

$3 + 4 =$

$$\begin{array}{r} 3 + \\ 4 \\ \hline 7 \end{array}$$

$6 + 6 =$

$$\begin{array}{r} 9 + \\ 8 \\ 2 \\ \hline 1 \end{array}$$

$8 + 7 =$

$$\begin{array}{r} 7 + \\ 6 \\ 3 \\ \hline 4 \end{array}$$

$5 + 9 =$

$$\begin{array}{r} 8 + \\ 8 \\ 3 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 14 + \\ \hline 5 \end{array}$$

$$\begin{array}{r} 26 + \\ \hline 33 \end{array}$$

$$\begin{array}{r} 54 + \\ \hline 20 \end{array}$$

$$\begin{array}{r} 36 + \\ \hline 44 \end{array}$$

$$\begin{array}{r} 17 + \\ \hline 29 \end{array}$$

$$\begin{array}{r} 64 + \\ \hline 58 \end{array}$$

$$\begin{array}{r} 53 + \\ \hline 78 \end{array}$$

$$\begin{array}{r} 77 + \\ \hline 65 \end{array}$$

$$\begin{array}{r} 315 + \\ \hline 137 \end{array}$$

$$\begin{array}{r} 452 + \\ \hline 249 \end{array}$$

$$\begin{array}{r} 506 + \\ \hline 84 \end{array}$$

$$\begin{array}{r} 375 + \\ \hline 460 \end{array}$$

$$\begin{array}{r} 128 + \\ 251 \\ \hline 436 \end{array}$$

$$\begin{array}{r} 607 + \\ 320 \\ \hline 392 \end{array}$$

$$\begin{array}{r} 529 + \\ 18 \\ \hline 753 \end{array}$$

$$\begin{array}{r} 658 + \\ 99 \\ \hline 776 \end{array}$$

$$\begin{array}{r} 532 + \\ 1807 \\ 321 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 7520 + \\ 165 \\ 3178 \\ \hline 4221 \end{array}$$

$$\begin{array}{r} 3479 + \\ 1009 \\ 3795 \\ \hline 4556 \end{array}$$

$$\begin{array}{r} 2496 + \\ 4032 \\ 1006 \\ \hline 28 \end{array}$$

How to Add

If you can do this: $\begin{array}{r} 3 + \\ \underline{4} \end{array}$ and this: $\begin{array}{r} 61 + \\ \underline{25} \end{array}$

how about this: $\begin{array}{r} 28 + ? \\ \underline{34} \end{array}$

Start from the right hand side as usual:

Say $8 + 4 = 12$

Put down the 2

$$\begin{array}{r} \text{T U} \\ 28 + \\ \underline{34} \\ 2 \\ \underline{1} \end{array}$$

'carry' the 1 (That means write it under the next column to the left)

Now add the numbers on the left

Say $2 + 3 = 5$

and $1 + 5 = 6$

You add on the number you 'carried'

Put the 6 under the tens column.

The answer is 62

$$\begin{array}{r} \text{T U} \\ 28 + \\ \underline{34} \\ 62 \\ \underline{1} \end{array}$$

Now try these:

$$\begin{array}{r} 59 + \\ \underline{42} \end{array}$$

$$\begin{array}{r} 37 + \\ \underline{53} \end{array}$$

$$\begin{array}{r} 88 + \\ \underline{17} \end{array}$$

$$\begin{array}{r} 65 + \\ \underline{28} \end{array}$$

Adding Single Numbers

$6 + 4 =$

$8 + 3 =$

$8 + 8 =$

$5 + 6 =$

$9 + 2 =$

$7 + 9 =$

$6 + 7 =$

$8 + 4 =$

$7 + 7 =$

$9 + 8 =$

$9 + 6 =$

$5 + 8 =$

$6 + 7 =$

$8 + 6 =$

$3 + 7 =$

$9 + 9 =$

$6 + 6 =$

$4 + 9 =$

$7 + 8 =$

$7 + 5 =$

$$\begin{array}{r} 6 + \\ 7 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 9 + \\ 6 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 9 + \\ 7 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 5 + \\ 4 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 7 + \\ 5 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 4 + \\ 3 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 1 + \\ 9 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 7 + \\ 2 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 8 + \\ 5 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 3 + \\ 9 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 5 + \\ 9 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 8 + \\ 9 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 2 + \\ 7 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 7 + \\ 5 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 9 + \\ 4 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 4 + \\ 7 \\ 6 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 9 + \\ 3 \\ 2 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 8 + \\ 6 \\ 4 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 3 + \\ 8 \\ 7 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 9 + \\ 3 \\ 9 \\ \hline 4 \end{array}$$

Add

$$\begin{array}{r} \text{TU} \\ 48 + \\ \underline{13} \end{array}$$

$$\begin{array}{r} \text{TU} \\ 66 + \\ \underline{15} \end{array}$$

$$\begin{array}{r} \text{TU} \\ 28 + \\ \underline{14} \end{array}$$

$$\begin{array}{r} \text{TU} \\ 72 + \\ \underline{19} \end{array}$$

$$\begin{array}{r} \text{TU} \\ 56 + \\ \underline{26} \end{array}$$

$$\begin{array}{r} 69 + \\ \underline{22} \end{array}$$

$$\begin{array}{r} 43 + \\ \underline{27} \end{array}$$

$$\begin{array}{r} 69 + \\ \underline{14} \end{array}$$

$$\begin{array}{r} 57 + \\ \underline{27} \end{array}$$

$$\begin{array}{r} 88 + \\ \underline{4} \end{array}$$

$$\begin{array}{r} 76 + \\ \underline{18} \end{array}$$

$$\begin{array}{r} 35 + \\ \underline{49} \end{array}$$

$$\begin{array}{r} 27 + \\ \underline{57} \end{array}$$

$$\begin{array}{r} 39 + \\ \underline{32} \end{array}$$

$$\begin{array}{r} 58 + \\ \underline{18} \end{array}$$

$$\begin{array}{r} 36 + \\ \underline{16} \end{array}$$

$$\begin{array}{r} 49 + \\ \underline{26} \end{array}$$

$$\begin{array}{r} 63 + \\ \underline{19} \end{array}$$

$$\begin{array}{r} 89 + \\ \underline{9} \end{array}$$

Adding-Up Problems

1. My fare to work is 45p. How much does it cost to go to work and come home again?
2. If this Tuesday is the 8th of May, what is the date next Tuesday?
3. My friend's rent has gone up by £1.20 a month. She used to pay £60. How much is it now?
4. The score at half-time was Arsenal 2, West Ham 0. West Ham scored 3 goals in the second half and Arsenal did not score again, so what was the score at the end of the match?
5. Pat is 25, Jean is 6 years older, how old is Jean?
6. Today I had a cheese salad for 82p and a cup of tea, 16p, for lunch. How much did my lunch cost altogether?
7. Fred's holiday was going to be from the 3rd June to the 17th June. Now he finds he's got to change the dates to begin and end 10 days later. What are the new dates?
8. Annette's three children each wanted an ice cream. Tom wanted a choc-ice costing 35p, Liz wanted a wafer costing 22p and Linda wanted a lolly costing 19p. How much did it all come to?
9. What year will it be in 5 years' time?
10. What is the date one week from today?

Add

$$\begin{array}{r} 264 + \\ \underline{513} \end{array}$$

$$\begin{array}{r} 382 + \\ \underline{116} \end{array}$$

$$\begin{array}{r} 523 + \\ \underline{371} \end{array}$$

$$\begin{array}{r} 483 + \\ \underline{513} \end{array}$$

$$\begin{array}{r} 276 + \\ \underline{413} \end{array}$$

$$\begin{array}{r} 278 + \\ \underline{321} \end{array}$$

$$\begin{array}{r} 287 + \\ \underline{512} \end{array}$$

$$\begin{array}{r} 463 + \\ \underline{234} \end{array}$$

$$\begin{array}{r} 862 + \\ \underline{117} \end{array}$$

$$\begin{array}{r} 354 + \\ \underline{625} \end{array}$$

$$\begin{array}{r} 642 + \\ \underline{123} \end{array}$$

$$\begin{array}{r} 572 + \\ \underline{315} \end{array}$$

$$\begin{array}{r} 521 + \\ \underline{337} \end{array}$$

$$\begin{array}{r} 518 + \\ \underline{261} \end{array}$$

$$\begin{array}{r} 327 + \\ \underline{162} \end{array}$$

$$\begin{array}{r} 634 + \\ \underline{312} \end{array}$$

$$\begin{array}{r} 776 + \\ \underline{121} \end{array}$$

$$\begin{array}{r} 343 + \\ \underline{514} \end{array}$$

How Well Can You Take Away?

$2 - 1 =$

$6 - 4 =$

$10 - 5 =$

$8 - 2 =$

$11 - 3 =$

$15 - 6 =$

$$\begin{array}{r} 30 - \\ 10 \end{array}$$

$$\begin{array}{r} 18 - \\ 6 \end{array}$$

$$\begin{array}{r} 45 - \\ 32 \end{array}$$

$$\begin{array}{r} 99 - \\ 87 \end{array}$$

$$\begin{array}{r} 13 - \\ 7 \end{array}$$

$$\begin{array}{r} 34 - \\ 16 \end{array}$$

$$\begin{array}{r} 80 - \\ 78 \end{array}$$

$$\begin{array}{r} 100 - \\ 99 \end{array}$$

$$\begin{array}{r} 250 - \\ 125 \end{array}$$

$$\begin{array}{r} 327 - \\ 129 \end{array}$$

$$\begin{array}{r} 472 - \\ 365 \end{array}$$

$$\begin{array}{r} 588 - \\ 298 \end{array}$$

$$\begin{array}{r} 536 - \\ 156 \end{array}$$

$$\begin{array}{r} 371 - \\ 203 \end{array}$$

$$\begin{array}{r} 318 - \\ 89 \end{array}$$

$$\begin{array}{r} 407 - \\ 316 \end{array}$$

$$\begin{array}{r} 894 - \\ 776 \end{array}$$

$$\begin{array}{r} 243 - \\ 75 \end{array}$$

$$\begin{array}{r} 3604 - \\ 1759 \end{array}$$

$$\begin{array}{r} 2060 - \\ 399 \end{array}$$

$$\begin{array}{r} 58762 - \\ 6898 \end{array}$$

$$\begin{array}{r} 27908 - \\ 8799 \end{array}$$

Take Away - No borrowing

$$\begin{array}{r} 15 - \\ \underline{3} \end{array}$$

$$\begin{array}{r} 17 - \\ \underline{2} \end{array}$$

$$\begin{array}{r} 14 - \\ \underline{2} \end{array}$$

$$\begin{array}{r} 13 - \\ \underline{3} \end{array}$$

$$\begin{array}{r} 16 - \\ \underline{1} \end{array}$$

$$\begin{array}{r} 19 - \\ \underline{8} \end{array}$$

$$\begin{array}{r} 27 - \\ \underline{13} \end{array}$$

$$\begin{array}{r} 26 - \\ \underline{14} \end{array}$$

$$\begin{array}{r} 25 - \\ \underline{14} \end{array}$$

$$\begin{array}{r} 24 - \\ \underline{13} \end{array}$$

$$\begin{array}{r} 28 - \\ \underline{11} \end{array}$$

$$\begin{array}{r} 29 - \\ \underline{18} \end{array}$$

$$\begin{array}{r} 36 - \\ \underline{21} \end{array}$$

$$\begin{array}{r} 33 - \\ \underline{11} \end{array}$$

$$\begin{array}{r} 37 - \\ \underline{12} \end{array}$$

$$\begin{array}{r} 35 - \\ \underline{21} \end{array}$$

$$\begin{array}{r} 34 - \\ \underline{22} \end{array}$$

$$\begin{array}{r} 32 - \\ \underline{11} \end{array}$$

$$\begin{array}{r} 42 - \\ \underline{21} \end{array}$$

$$\begin{array}{r} 47 - \\ \underline{24} \end{array}$$

$$\begin{array}{r} 44 - \\ \underline{22} \end{array}$$

$$\begin{array}{r} 48 - \\ \underline{33} \end{array}$$

$$\begin{array}{r} 46 - \\ \underline{25} \end{array}$$

$$\begin{array}{r} 41 - \\ \underline{30} \end{array}$$

$$\begin{array}{r} 58 - \\ \underline{31} \end{array}$$

$$\begin{array}{r} 52 - \\ \underline{31} \end{array}$$

$$\begin{array}{r} 54 - \\ \underline{41} \end{array}$$

$$\begin{array}{r} 56 - \\ \underline{24} \end{array}$$

$$\begin{array}{r} 53 - \\ \underline{12} \end{array}$$

$$\begin{array}{r} 55 - \\ \underline{22} \end{array}$$

$$\begin{array}{r} 64 - \\ \underline{51} \end{array}$$

$$\begin{array}{r} 66 - \\ \underline{33} \end{array}$$

$$\begin{array}{r} 62 - \\ \underline{41} \end{array}$$

$$\begin{array}{r} 63 - \\ \underline{51} \end{array}$$

$$\begin{array}{r} 65 - \\ \underline{42} \end{array}$$

$$\begin{array}{r} 67 - \\ \underline{16} \end{array}$$

How to Take Away - Borrowing Method

$$\begin{array}{r} \text{T} \quad \text{U} \\ 4 \quad 13 - \\ \underline{12 \quad 6} \\ 1 \quad 7 \end{array}$$

This is one way of doing take-away sums.

Start from the right hand side as usual.

Say $3 - 6$ you can't do it.

So borrow from the tens column.

You need to borrow 1 lot of ten.

Put the 1 next to the 3 to make 13

Now say $13 - 6 = 7$

Write the 7 down under the units column

You need to pay back the ten you borrowed

Remember that, back in its own column,

the ten is only worth 1

So put 1 next to the 2 to make 3

Now say $4 - 3 = 1$

Write the 1 down under the tens column

You've done it. The answer is 17

Now try these:

$$\begin{array}{r} 62 - \\ 37 \end{array}$$

$$\begin{array}{r} 41 - \\ 18 \end{array}$$

$$\begin{array}{r} 93 - \\ 25 \end{array}$$

$$\begin{array}{r} 84 - \\ 26 \end{array}$$

$$\begin{array}{r} \text{T} \quad \text{U} \\ 4 \quad 13 - \\ \underline{2 \quad 6} \\ 7 \end{array}$$

$$\begin{array}{r} \text{T} \quad \text{U} \\ 4 \quad 13 - \\ \underline{12 \quad 6} \\ 1 \quad 7 \end{array}$$

How to Take Away - Counting - on Method

This method builds up numbers to round tens and hundreds.

How much do we need to add to 22 to make it up to 46?

46 -	Add 8 to make it up to 30	8 +
<u>22</u>	add 16 to make 30 up to 46	<u>16</u>
	So the answer is 24	<u>24</u>

51 -	Add 4 to make 36 up to 40	4 +
<u>36</u>	Add 11 to make 40 up to 51	<u>11</u>
	So the answer is 15	<u>15</u>

229 -	Add 5 to 15 to make 20	5 +
<u>115</u>	Add 80 to 120 to make 200	80
	Add 29 to make 114	<u>29</u>
	So the answer is 114	<u>114</u>

342 -	Add 3 to 37 to make 40	3 +
<u>137</u>	Add 60 to 140 to make 200	60
	Add 142 to 200 to make 342	<u>142</u>
	So the answer is 205	<u>205</u>

Now try these:

84 -
<u>76</u>

253 -
<u>166</u>

405 -
<u>291</u>

1562 -
<u>944</u>

How to Take Away - Decomposition Method

This method splits the numbers into hundreds, tens and units

No borrowing

$$\begin{array}{r} 37 - \\ 14 \\ \hline 23 \end{array}$$

this can be written

$$\begin{array}{r} 30 + 7 - \\ 10 + 4 \\ \hline 20 + 3 \end{array}$$

Each part of the sum is worked on its own: $30 - 10 = 20$; $7 - 4 = 3$

Borrowing

$$\begin{array}{r} 37 - \\ 18 \end{array}$$

this becomes

$$\begin{array}{r} 30 + 7 - \\ 10 + 8 \end{array}$$

But we can't take 8 from 7, so we split 37 in a different way, into $20 + 17$.

So

$$\begin{array}{r} 30 + 7 - \\ 10 + 8 \end{array}$$

becomes

$$\begin{array}{r} 20 + 17 - \\ 10 + 8 \\ \hline 10 + 9 \end{array}$$

In short form, we write

$$\begin{array}{r} 2\cancel{3}^1 7 - \\ 1 8 \\ \hline 1 9 \end{array}$$

Follow these examples:

$$\begin{array}{r} 54 - \\ 26 \end{array} \longrightarrow \begin{array}{r} 50 + 4 - \\ 20 + 6 \end{array} \longrightarrow \begin{array}{r} 40 + 14 - \\ 20 + 6 \\ \hline 20 + 8 \end{array} \longrightarrow \begin{array}{r} 4\cancel{5}^1 4 - \\ 2 6 \\ \hline 2 8 \end{array}$$

$$\begin{array}{r} 372 - \\ 159 \end{array} \longrightarrow \begin{array}{r} 300 + 70 + 2 - \\ 100 + 50 + 9 \end{array} \longrightarrow \begin{array}{r} 300 + 60 + 12 - \\ 100 + 50 + 9 \\ \hline 200 + 10 + 3 \end{array} \longrightarrow \begin{array}{r} 3\cancel{7}^6 2 - \\ 1 5 9 \\ \hline 2 1 3 \end{array}$$

Now try these:

$$\begin{array}{r} 85 - \\ 48 \end{array} \quad \begin{array}{r} 42 - \\ 17 \end{array} \quad \begin{array}{r} 254 - \\ 149 \end{array} \quad \begin{array}{r} 526 - \\ 218 \end{array} \quad \begin{array}{r} 373 - \\ 127 \end{array}$$

Borrowing when there are no tens

$$\begin{array}{r} 307 - \\ 49 \end{array} \longrightarrow \begin{array}{r} 300 + 0 + 7 - \\ 40 + 9 \end{array} \longrightarrow \begin{array}{r} 200 + 90 + 17 - \\ 40 + 9 \end{array} \longrightarrow \begin{array}{r} 2\cancel{3}^9\cancel{0}^1 7 - \\ 4 9 \\ \hline 2 5 8 \end{array}$$

At stage 3 we have to borrow from the hundreds because there are no tens.

We take ten from the hundred we have borrowed to go with the 7, leaving 90.

So $307 = 300 + 7 = 200 + 100 + 7 = 200 + 90 + 17$

Try these:

$$\begin{array}{r} 204 - \\ 158 \end{array} \quad \begin{array}{r} 508 - \\ 99 \end{array} \quad \begin{array}{r} 301 - \\ 253 \end{array} \quad \begin{array}{r} 205 - \\ 88 \end{array} \quad \begin{array}{r} 502 - \\ 425 \end{array}$$

Take Away

$$\begin{array}{r} 61 - \\ \underline{35} \end{array}$$

$$\begin{array}{r} 43 - \\ \underline{28} \end{array}$$

$$\begin{array}{r} 72 - \\ \underline{49} \end{array}$$

$$\begin{array}{r} 55 - \\ \underline{47} \end{array}$$

$$\begin{array}{r} 37 - \\ \underline{19} \end{array}$$

$$\begin{array}{r} 24 - \\ \underline{16} \end{array}$$

$$\begin{array}{r} 81 - \\ \underline{38} \end{array}$$

$$\begin{array}{r} 62 - \\ \underline{17} \end{array}$$

$$\begin{array}{r} 45 - \\ \underline{38} \end{array}$$

$$\begin{array}{r} 172 - \\ \underline{89} \end{array}$$

$$\begin{array}{r} 423 - \\ \underline{76} \end{array}$$

$$\begin{array}{r} 833 - \\ \underline{189} \end{array}$$

$$\begin{array}{r} 602 - \\ \underline{363} \end{array}$$

$$\begin{array}{r} 510 - \\ \underline{297} \end{array}$$

$$\begin{array}{r} 304 - \\ \underline{148} \end{array}$$

Taking Away Problems

1. Jim is 46. How old was he in 1970?
2. I left home with £10.00 in my purse. I spent £3.00 on groceries and 28p on a bunch of flowers. How much did I have left?
3. Bill's gross pay is £84.92. After tax and National Insurance and other deductions which altogether come to £30.70, how much should his take-home pay be?
4. The time in New York is 5 hours behind us in Britain. When it's 11 o'clock in the morning here, what time is it in New York?
5. What time is it now?
What time was it a quarter of a hour ago?
6. Jean is very shy about her age but the other day she mentioned that she was born just after the 1st World War. About how old is she now?
7. This month is
5 months ago it was
8. George is 50, his sister is 9 years younger, how old is she?
9. In a room are 25 adults, 6 are men, how many are women?
10. Joe got a pay rise of £6 a week which brought his pay up to £95. What did he get before the rise?

How Well Can You Multiply?

$4 \times 5 =$

$2 \times 6 =$

$7 \times 8 =$

$5 \times 9 =$

$6 \times 6 =$

$12 \times 2 =$

$$\begin{array}{r} 18 \times \\ \underline{3} \end{array}$$

$$\begin{array}{r} 26 \times \\ \underline{4} \end{array}$$

$$\begin{array}{r} 33 \times \\ \underline{5} \end{array}$$

$$\begin{array}{r} 69 \times \\ \underline{6} \end{array}$$

$$\begin{array}{r} 20 \times \\ \underline{5} \end{array}$$

$$\begin{array}{r} 84 \times \\ \underline{7} \end{array}$$

$$\begin{array}{r} 62 \times \\ \underline{7} \end{array}$$

$$\begin{array}{r} 49 \times \\ \underline{6} \end{array}$$

$$\begin{array}{r} 98 \times \\ \underline{8} \end{array}$$

$$\begin{array}{r} 88 \times \\ \underline{6} \end{array}$$

$$\begin{array}{r} 104 \times \\ \underline{4} \end{array}$$

$$\begin{array}{r} 326 \times \\ \underline{7} \end{array}$$

$$\begin{array}{r} 230 \times \\ \underline{6} \end{array}$$

$$\begin{array}{r} 345 \times \\ \underline{9} \end{array}$$

$$\begin{array}{r} 28 \times \\ \underline{10} \end{array}$$

$$\begin{array}{r} 35 \times \\ \underline{30} \end{array}$$

$$\begin{array}{r} 271 \times \\ \underline{11} \end{array}$$

$$\begin{array}{r} 198 \times \\ \underline{11} \end{array}$$

$$\begin{array}{r} 307 \times \\ \underline{12} \end{array}$$

$$\begin{array}{r} 450 + \\ \underline{12} \end{array}$$

$$\begin{array}{r} 586 \times \\ \underline{15} \end{array}$$

$$\begin{array}{r} 349 \times \\ \underline{21} \end{array}$$

$$\begin{array}{r} 727 \times \\ \underline{34} \end{array}$$

$$\begin{array}{r} 89 \times \\ \underline{64} \end{array}$$

$$\begin{array}{r} 608 \times \\ \underline{60} \end{array}$$

$$\begin{array}{r} 337 \times \\ \underline{48} \end{array}$$

$$\begin{array}{r} 750 \times \\ \underline{29} \end{array}$$

$$\begin{array}{r} 1834 \times \\ \underline{56} \end{array}$$

$$\begin{array}{r} 2072 \times \\ \underline{37} \end{array}$$

$$\begin{array}{r} 158 \times \\ \underline{99} \end{array}$$

$$\begin{array}{r} 326 \times \\ \underline{150} \end{array}$$

$$\begin{array}{r} 872 \times \\ \underline{206} \end{array}$$

$$\begin{array}{r} 1760 \times \\ \underline{367} \end{array}$$

$$\begin{array}{r} 8121 \times \\ \underline{286} \end{array}$$

Multiplication Square

Use this to check the times tables. For example, to find 4×3 go along the 3 line and down the 4 line, where the lines meet is where the answer is, in this case, $4 \times 3 = 12$.

You can also go along the 4 line and down the 3 line because $3 \times 4 = 12$ as well.

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

Fill in the Blanks

Use the multiplication square (if you need it)

$5 \times 9 =$

$3 \times 7 =$

$9 \times 10 =$

$6 \times 5 =$

$7 \times 6 =$

$8 \times 9 =$

$6 \times 8 =$

$4 \times 9 =$

$9 \times 8 =$

$9 \times 7 =$

$6 \times 9 =$

$9 \times 6 =$

$8 \times 8 =$

$8 \times 7 =$

$7 \times 8 =$

Fill in the blanks

$8 \times \quad = 64$

$7 \times \quad = 56$

$\quad \times 4 = 36$

$\quad \times 9 = 81$

$\quad \times 9 = 45$

$5 \times \quad = 35$

$\quad \times 9 = 63$

$7 \times \quad = 49$

$\quad \times 8 = 40$

Find pairs of numbers to fill the blanks:

$\quad \times \quad = 60$

$\quad \times \quad = 21$

$\quad \times \quad = 18$

$\quad \times \quad = 24$

$\quad \times \quad = 16$

$\quad \times \quad = 18$

$\quad \times \quad = 24$

$\quad \times \quad = 16$

$\quad \times \quad = 33$

$\quad \times \quad = 35$

$\quad \times \quad = 54$

$\quad \times \quad = 48$

Times Tables 1

One times table:

$1 \times 1 = 1$ one times one is one

$$\times 1 = 2$$

$$\times 1 = 3$$

$$\times 1 = 4$$

$$\times 1 = 5$$

$$\times 1 = 6$$

$$\times 1 = 7$$

$$\times 1 = 8$$

$$\times 1 = 9$$

$$\times 1 = 10$$

Two times table:

$1 \times 2 = 2$ one times two is two

$$\times 2 = 4$$

$$\times 2 = 6$$

$$\times 2 = 8$$

$$\times 2 = 10$$

$$\times 2 = 12$$

$$\times 2 = 14$$

$$\times 2 = 16$$

$$\times 2 = 18$$

$$\times 2 = 20$$

Three times table:

$1 \times 3 = 3$ one times three is three

$$\times 3 = 6$$

$$\times 3 = 9$$

$$\times 3 = 12$$

$$\times 3 = 15$$

$$\times 3 = 18$$

$$\times 3 = 21$$

$$\times 3 = 24$$

$$\times 3 = 27$$

$$\times 3 = 30$$

Four times table:

$1 \times 4 = 4$ one times four is four

$$\times 4 = 8$$

$$\times 4 = 12$$

$$\times 4 = 16$$

$$\times 4 = 20$$

$$\times 4 = 24$$

$$\times 4 = 28$$

$$\times 4 = 32$$

$$\times 4 = 36$$

$$\times 4 = 40$$

Five times table:

$1 \times 5 = 5$ one times five is five

$$\times 5 = 10$$

$$\times 5 = 15$$

$$\times 5 = 20$$

$$\times 5 = 25$$

$$\times 5 = 30$$

$$\times 5 = 35$$

$$\times 5 = 40$$

$$\times 5 = 45$$

$$\times 5 = 50$$

Times Tables 1 - Continued

Six times table:

$1 \times 6 = 6$ one times six is six

$\times 6 = 12$

$\times 6 = 18$

$\times 6 = 24$

$\times 6 = 30$

$\times 6 = 36$

$\times 6 = 42$

$\times 6 = 48$

$\times 6 = 54$

$\times 6 = 60$

Seven times table:

$1 \times 7 = 7$ one times seven is seven

$\times 7 = 14$

$\times 7 = 21$

$\times 7 = 28$

$\times 7 = 35$

$\times 7 = 42$

$\times 7 = 49$

$\times 7 = 56$

$\times 7 = 63$

$\times 7 = 70$

Eight times table:

$1 \times 8 = 8$ one times eight is eight

$\times 8 = 16$

$\times 8 = 24$

$\times 8 = 32$

$\times 8 = 40$

$\times 8 = 48$

$\times 8 = 56$

$\times 8 = 64$

$\times 8 = 72$

$\times 8 = 80$

Nine times table:

$1 \times 9 = 9$ one times nine is nine

$\times 9 = 18$

$\times 9 = 27$

$\times 9 = 36$

$\times 9 = 45$

$\times 9 = 54$

$\times 9 = 63$

$\times 9 = 72$

$\times 9 = 81$

$\times 9 = 90$

Ten times table:

$1 \times 10 = 10$ one times ten is ten

$\times 10 = 20$

$\times 10 = 30$

$\times 10 = 40$

$\times 10 = 50$

$\times 10 = 60$

$\times 10 = 70$

$\times 10 = 80$

$\times 10 = 90$

$\times 10 = 100$

Times Tables 2

One times table:

$$\begin{aligned}1 \times 1 &= 1 && \text{one times one is one} \\2 \times 1 &= \\3 \times 1 &= \\4 \times 1 &= \\5 \times 1 &= \\6 \times 1 &= \\7 \times 1 &= \\8 \times 1 &= \\9 \times 1 &= \\10 \times 1 &= \end{aligned}$$

Two times table:

$$\begin{aligned}1 \times 2 &= 2 && \text{one times two is two} \\2 \times 2 &= \\3 \times 2 &= \\4 \times 2 &= \\5 \times 2 &= \\6 \times 2 &= \\7 \times 2 &= \\8 \times 2 &= \\9 \times 2 &= \\10 \times 2 &= \end{aligned}$$

Three times table:

$$\begin{aligned}1 \times 3 &= && \text{one times three is three} \\2 \times 3 &= \\3 \times 3 &= \\4 \times 3 &= \\5 \times 3 &= \\6 \times 3 &= \\7 \times 3 &= \\8 \times 3 &= \\9 \times 3 &= \\10 \times 3 &= \end{aligned}$$

Four times table:

$$\begin{aligned}1 \times 4 &= && \text{one times four is four} \\2 \times 4 &= \\3 \times 4 &= \\4 \times 4 &= \\5 \times 4 &= \\6 \times 4 &= \\7 \times 4 &= \\8 \times 4 &= \\9 \times 4 &= \\10 \times 4 &= \end{aligned}$$

Five times table:

$$\begin{aligned}1 \times 5 &= 5 && \text{one times five is five} \\2 \times 5 &= \\3 \times 5 &= \\4 \times 5 &= \\5 \times 5 &= \\6 \times 5 &= \\7 \times 5 &= \\8 \times 5 &= \\9 \times 5 &= \\10 \times 5 &= \end{aligned}$$

Times Tables 2-Continued

Six times table:

$$\begin{array}{l} 1 \times 6 = 6 \quad \text{one times six is six} \\ 2 \times 6 = \\ 3 \times 6 = \\ 4 \times 6 = \\ 5 \times 6 = \\ 6 \times 6 = \\ 7 \times 6 = \\ 8 \times 6 = \\ 9 \times 6 = \\ 10 \times 6 = \end{array}$$

Seven times table:

$$\begin{array}{l} 1 \times 7 = 7 \quad \text{one times seven is seven} \\ 2 \times 7 = \\ 3 \times 7 = \\ 4 \times 7 = \\ 5 \times 7 = \\ 6 \times 7 = \\ 7 \times 7 = \\ 8 \times 7 = \\ 9 \times 7 = \\ 10 \times 7 = \end{array}$$

Eight times table:

$$\begin{array}{l} 1 \times 8 = 8 \quad \text{one times eight is eight} \\ 2 \times 8 = \\ 3 \times 8 = \\ 4 \times 8 = \\ 5 \times 8 = \\ 6 \times 8 = \\ 7 \times 8 = \\ 8 \times 8 = \\ 9 \times 8 = \\ 10 \times 8 = \end{array}$$

Nine times table:

$$\begin{array}{l} 1 \times 9 = 9 \quad \text{one times nine is nine} \\ 2 \times 9 = \\ 3 \times 9 = \\ 4 \times 9 = \\ 5 \times 9 = \\ 6 \times 9 = \\ 7 \times 9 = \\ 8 \times 9 = \\ 9 \times 9 = \\ 10 \times 9 = \end{array}$$

Ten times table:

$$\begin{array}{l} 1 \times 10 = 10 \quad \text{one times ten is ten} \\ 2 \times 10 = \\ 3 \times 10 = \\ 4 \times 10 = \\ 5 \times 10 = \\ 6 \times 10 = \\ 7 \times 10 = \\ 8 \times 10 = \\ 9 \times 10 = \\ 10 \times 10 = \end{array}$$

Times Table Test Sheet

Fill in the gaps:

$2 \times 4 = 8$

$7 \times 8 =$

$8 \times 9 =$

$3 \times 2 =$

$4 \times 10 =$

$7 \times 7 =$

$7 \times 3 =$

$6 \times 3 =$

$4 \times = 36$

$2 \times = 10$

$2 \times = 18$

$7 \times = 63$

$3 \times = 30$

$7 \times = 35$

$10 \times = 90$

$3 \times 3 =$

$10 \times = 50$

$1 \times = 10$

$4 \times = 16$

$9 \times 9 =$

$4 \times 8 =$

$5 \times = 20$

$\times 8 = 40$

$6 \times 9 =$

$\times 5 = 30$

$9 \times = 54$

$2 \times = 12$

$\times 4 = 32$

$6 \times 8 =$

$\times 3 = 27$

$7 \times = 42$

$8 \times = 16$

$8 \times = 64$

$4 \times = 28$

$8 \times 7 =$

$10 \times = 60$

$6 \times 6 =$

$5 \times 9 =$

$8 \times 10 =$

$5 \times = 25$

$\times 7 = 70$

Short Multiplication

$$\begin{array}{r} 42 \times \\ \underline{6} \end{array}$$

$$\begin{array}{r} 53 \times \\ \underline{4} \end{array}$$

$$\begin{array}{r} 67 \times \\ \underline{5} \end{array}$$

$$\begin{array}{r} 35 \times \\ \underline{7} \end{array}$$

$$\begin{array}{r} 84 \times \\ \underline{9} \end{array}$$

$$\begin{array}{r} 63 \times \\ \underline{6} \end{array}$$

$$\begin{array}{r} 21 \times \\ \underline{8} \end{array}$$

$$\begin{array}{r} 70 \times \\ \underline{3} \end{array}$$

$$\begin{array}{r} 97 \times \\ \underline{6} \end{array}$$

$$\begin{array}{r} 123 \times \\ \underline{6} \end{array}$$

$$\begin{array}{r} 518 \times \\ \underline{9} \end{array}$$

$$\begin{array}{r} 704 \times \\ \underline{7} \end{array}$$

$$\begin{array}{r} 806 \times \\ \underline{5} \end{array}$$

$$\begin{array}{r} 902 \times \\ \underline{7} \end{array}$$

$$\begin{array}{r} 510 \times \\ \underline{8} \end{array}$$

Short Multiplication Problems

1. Six people went to the cinema. Their seats cost £2.50 each. How much did they pay altogether?
2. How much do ten first class stamps cost?
3. The milkman delivers 2 pints of milk a day. Each pint costs 22p. How much should my bill be at the end of the week?
4. My return fare to work costs me 80p. How much do I pay for 5 days travel?
5. I want 6 shrubs for my garden. Each one costs £2.50. How much must I pay altogether?
6. How many flats are there in a block with 13 floors and 2 flats on each floor?
7. There are 3 months to go before my holiday. If I save £15 a month how much will I have by the time I go?
8. I need 9 tiles to tile my bathroom floor. Each tile costs 60p. How much will it cost to do the job?
9. 1 litre of petrol costs 50p. How much will 6 litres come to?
10. A round of drinks at the pub cost £1.40. That was for 3 pints of bitter at 70p. Was the price charged correct?. If not, what should it have been?

Multiplying By 10

The rule is 'put 0 on the end' - but why?

$$\begin{array}{l} 9 \times 10 = 90 \\ 25 \times 10 = 250 \end{array} \quad \begin{array}{l} 7 \times 10 = 70 \\ 181 \times 10 = 1810 \end{array}$$

The number 25 stands for 2 tens and 5 units and is written in columns like this:

Remember, each column to the left has the value of 10 times the previous one.

When we multiply by 10, we want each figure to stand for something 10 times bigger.

Th	H	T	U
		2	5

$1000 = 100 \times 10$ $100 = 10 \times 10$ $10 = 10 \times 1$

So hundreds become thousands
tens become hundreds
units become tens

That is, the figures move 1 column to the left.

It looks like this

original number
10 times bigger

Th	H	T	U
	2	5	
	2	5	0

The units column is now empty.

We must show this by putting in 0 to hold the place.

This shows the difference between
25 and 250

$$\begin{array}{l} 350 \times 10 = 3500 \\ 1\ 972 \times 10 = 19720 \\ 3\ 785 \times 10 = 37850 \\ 118 \times 10 = 1180 \end{array}$$

Multiply By 10, 20, 30 and So On

$$\begin{array}{r} 15 \times \\ \underline{10} \end{array}$$

$$\begin{array}{r} 15 \times \\ \underline{20} \end{array}$$

$$\begin{array}{r} 15 \times \\ \underline{30} \end{array}$$

$$\begin{array}{r} 15 \times \\ \underline{40} \end{array}$$

$$\begin{array}{r} 15 \times \\ \underline{50} \end{array}$$

$$\begin{array}{r} 15 \times \\ \underline{60} \end{array}$$

$$\begin{array}{r} 23 \times \\ \underline{10} \end{array}$$

$$\begin{array}{r} 23 \times \\ \underline{20} \end{array}$$

$$\begin{array}{r} 23 \times \\ \underline{30} \end{array}$$

$$\begin{array}{r} 23 \times \\ \underline{40} \end{array}$$

$$\begin{array}{r} 23 \times \\ \underline{50} \end{array}$$

$$\begin{array}{r} 23 \times \\ \underline{60} \end{array}$$

$$\begin{array}{r} 31 \times \\ \underline{10} \end{array}$$

$$\begin{array}{r} 31 \times \\ \underline{30} \end{array}$$

$$\begin{array}{r} 31 \times \\ \underline{50} \end{array}$$

$$\begin{array}{r} 31 \times \\ \underline{70} \end{array}$$

$$\begin{array}{r} 31 \times \\ \underline{80} \end{array}$$

$$\begin{array}{r} 31 \times \\ \underline{90} \end{array}$$

$$\begin{array}{r} 42 \times \\ \underline{20} \end{array}$$

$$\begin{array}{r} 42 \times \\ \underline{40} \end{array}$$

$$\begin{array}{r} 42 \times \\ \underline{50} \end{array}$$

$$\begin{array}{r} 42 \times \\ \underline{60} \end{array}$$

$$\begin{array}{r} 42 \times \\ \underline{70} \end{array}$$

$$\begin{array}{r} 42 \times \\ \underline{90} \end{array}$$

$$\begin{array}{r} 56 \times \\ \underline{10} \end{array}$$

$$\begin{array}{r} 56 \times \\ \underline{30} \end{array}$$

$$\begin{array}{r} 56 \times \\ \underline{40} \end{array}$$

$$\begin{array}{r} 56 \times \\ \underline{60} \end{array}$$

$$\begin{array}{r} 56 \times \\ \underline{70} \end{array}$$

$$\begin{array}{r} 56 \times \\ \underline{80} \end{array}$$

$$\begin{array}{r} 67 \times \\ \underline{10} \end{array}$$

$$\begin{array}{r} 67 \times \\ \underline{20} \end{array}$$

$$\begin{array}{r} 67 \times \\ \underline{30} \end{array}$$

$$\begin{array}{r} 67 \times \\ \underline{40} \end{array}$$

$$\begin{array}{r} 67 \times \\ \underline{50} \end{array}$$

$$\begin{array}{r} 67 \times \\ \underline{60} \end{array}$$

Multiplying by 100

$$5 \times 100 = 500$$

$$32 \times 100 = 3200$$

32 stands for 3 tens and 2 units

In columns, it looks like this:

To multiply 32 by 100 we must make each figure stand for something 100 times bigger.

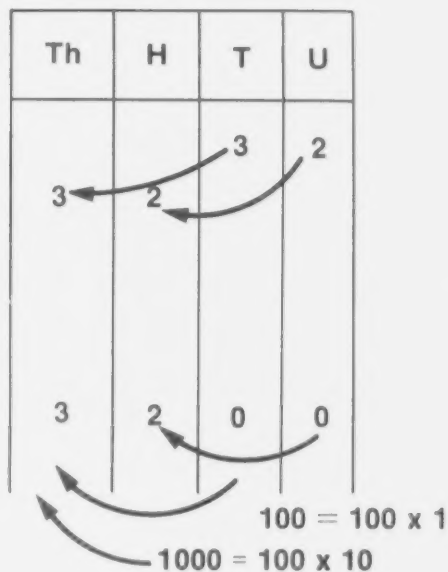
Units become hundreds
tens become thousands
hundreds become ten thousands

That is, the figure moves 2 columns to the left.

This leaves 2 empty columns - the units and tens.

We show this by putting 0 in each to hold the place and show the difference between 32 and 3200.

So the rule is "put 2 0's on the end"



$$6 \times 100 = 600$$

$$12 \times 100 = 1200$$

$$47 \times 100 = 4700$$

$$321 \times 100 = 32100$$

$$5\ 386 \times 100 = 538600$$

How to do Long Multiplication

$$\begin{array}{r} 48 \times \\ \underline{21} \\ 48 + \\ \underline{960} \\ 1008 \end{array}$$

1 + times
20 times
21 times

or

$$\begin{array}{r} 48 \times \\ \underline{21} \\ 960 + \\ \underline{48} \\ 1008 \end{array}$$

20 + times
1 times
21 times

You can multiply by 1 first and then by 2, or the other way round.

Use 0 as a place holder when you multiply by 2, because 2 means 2 tens, or 20.

$$\begin{array}{r} 65 \times \\ \underline{24} \end{array}$$

— +
—

$$\begin{array}{r} 35 \times \\ \underline{47} \end{array}$$

— +
—

$$\begin{array}{r} 79 \times \\ \underline{35} \end{array}$$

— +
—

$$\begin{array}{r} 58 \times \\ \underline{19} \end{array}$$

— +
—

$$\begin{array}{r} 86 \times \\ \underline{34} \end{array}$$

— +
—

$$\begin{array}{r} 44 \times \\ \underline{29} \end{array}$$

— +
—

Long Multiplication

$$\begin{array}{r} 65 \times \\ \underline{24} \end{array}$$

— +
—

$$\begin{array}{r} 38 \times \\ \underline{45} \end{array}$$

— +
—

$$\begin{array}{r} 79 \times \\ \underline{34} \end{array}$$

— +
—

$$\begin{array}{r} 87 \times \\ \underline{26} \end{array}$$

— +
—

$$\begin{array}{r} 94 \times \\ \underline{35} \end{array}$$

— +
—

$$\begin{array}{r} 53 \times \\ \underline{17} \end{array}$$

$$\begin{array}{r} 29 \times \\ \underline{46} \end{array}$$

$$\begin{array}{r} 71 \times \\ \underline{32} \end{array}$$

$$\begin{array}{r} 68 \times \\ \underline{51} \end{array}$$

$$\begin{array}{r} 77 \times \\ \underline{36} \end{array}$$

$$\begin{array}{r} 89 \times \\ \underline{25} \end{array}$$

$$\begin{array}{r} 62 \times \\ \underline{28} \end{array}$$

$$\begin{array}{r} 304 \times \\ \underline{31} \end{array}$$

$$\begin{array}{r} 210 \times \\ \underline{16} \end{array}$$

$$\begin{array}{r} 781 \times \\ \underline{45} \end{array}$$

Long Multiplication Problems

1. A woman earns £80 a week, how much is that a year?
2. I worked out the area of the floor of my kitchen to be 140 square feet. It measures 10 feet by 12 feet, was I right?
3. At the Cash and Carry 50 tins of dog food cost £10.00. In my local shop the same brand costs 28p a tin, how much would I save by buying in bulk?
4. 20 cigarettes a day is how many in a year?
5. Ted bought 12 boxes of bedding plants with 15 plants in each box. How many plants is that altogether?
6. Jean earned £95 a week for 11 weeks as a temporary secretary, how much did she make altogether?
7. Bill bet Dave that there were more than 1000 holes in a piece of pegboard. There were 24 rows of 12 holes, who won the bet?
8. My rent is £28.00 a week, how much do I pay in a year?
9. The rental on my television is £2.60 a week. I saw a similar model in a shop for £250, how long would it take me to pay that amount in rent? Would you carry on renting a TV or buy the one in the shop? Why?
10. My living room measures 7 metres by 6 metres. I want to buy some carpet for it and I've seen some I like at £8.95 a square metre. How much would it cost to carpet the room?

How Well Can You Divide

$$10 \div 2 = \quad 15 \div 3 = \quad 16 \div 4 = \quad 20 \div 5 = \quad 66 \div 6 =$$

$$2 \overline{)26} \quad 3 \overline{)636} \quad 4 \overline{)408} \quad 5 \overline{)550} \quad 3 \overline{)999}$$

$$4 \overline{)250} \quad 3 \overline{)812} \quad 7 \overline{)656} \quad 8 \overline{)306} \quad 9 \overline{)7790}$$

$$20 \overline{)76} \quad 23 \overline{)46} \quad 18 \overline{)360} \quad 33 \overline{)993} \quad 18 \overline{)376}$$

Writing Division Sums

There are three different ways of writing division sums:

$$6 \div 2 = 3$$

We say: six divided by two equals three.

$$\begin{array}{r} 3 \\ 2 \overline{)6} \end{array}$$

We say: two into six goes three.

$$\frac{6}{2} = 3$$

We say: six over two equals three.

The line means "divided by".

The top number is divided by the bottom number.

Write these division sums out in the three different ways:

$$12 \div 4 = 3$$

$$\begin{array}{r} 7 \\ 6 \overline{)42} \end{array}$$

$$\frac{18}{9} = 2$$

$$36 \div 9 = 4$$

Short Division

$$12 \div 3 = 4$$

We say: twelve divided by three makes four.

Take 12 counters, divide them into 3 groups with the same number of counters in each.

Each group should have 4 counters.

This should remind you of what happens when you multiply, you would say:

$$3 \times 4 = 12$$

three times four makes twelve.

When you divide you start with the biggest number and divide it up into groups of the same size. Divide is another name for sharing.

Try these division sums, (use the counters if you like).

$$15 \div 3 =$$

$$10 \div 2 =$$

$$9 \div 3 =$$

$$14 \div 2 =$$

$$20 \div 4 =$$

Analysing Numbers : Factors

Factors

Factors are numbers which multiply together to make another number
e.g.:

$$2 \times 3 = 6$$

2 and 3 are factors of 6 because they multiply together to make 6.

Find the factors of these numbers:

18 25 9 14 21

Prime Factors

Prime factors are the smallest numbers which a number can be broken down into.
e.g.

$$20 = 4 \times 5$$

$$20 = 2 \times 10$$

$$20 = 2 \times 2 \times 5$$

2 and 2 and 5 are prime factors of 20, because they are the smallest numbers which multiply together to make 20.

Break down these numbers into prime factors:

16	12	18
21	30	27
24	25	36

Prime Numbers

Prime numbers are numbers which cannot be broken down at all.
e.g.

1, 2, 3, 5, 7, 11, 13, 17, 19

Write down the rest of the prime numbers up to 100.

How to Divide

$$3 \overline{)516}$$

We say: 3 into 5 hundred and 16.

Start at the left-hand side.

Say 3 into 5 goes 1 and 2 left over.

$$3 \overline{)516} \begin{array}{r} 1 \\ \end{array}$$

The question is, what do you do with the 2 left over?

You could write the sum out in the same way as it's done in the Long Division Method worksheet in this pack.

There is a quicker way though, which some people prefer.

This is how you do it:

Put the 2 with the 1 in the 516 like this:

$$3 \overline{)5^216} \begin{array}{r} 17 \\ \end{array}$$

Now say, 3 into 21 goes 7, put the 7 above the 1.

Now say, 3 into 6 goes 2, put the 2 above the 6.

$$3 \overline{)5^216} \begin{array}{r} 172 \\ \end{array}$$

The answer is 172.

You've done it.

Dividing when there is a 0 in the number

You do this in exactly the same way:

$$4 \overline{)408}$$

We say: 4 into 4 goes 1 with nothing left over, put the 1 above the 4 in 408.

Then say: 4 into 0 goes 0, put the 0 above the 0 in 408

Then: 4 into 8 goes 2, put the 2 above the 8 in 408.

$$4 \overline{)408} \begin{array}{r} 102 \\ \end{array}$$

It's very important to put the 0 in the answer, otherwise your answer will be much too small, (12, when it should be 102).

You can check your answer by multiplying the answer by the number you were dividing by: in this case $102 \times 4 = 408$ so you can see the answer is correct.

What do you do if there is a remainder ?

There are three different ways of writing a remainder in a division sum. You choose the most appropriate way for the sum you are doing.

For example:

$$5 \overline{)28}$$

The answer is 5 and 3 left over, because $5 \times 5 = 25$ and 28 is 3 more than 25.

You can write that like this:

$$5 \overline{)28}$$

(some people put R or rem. for remainder)

or like this, as a fraction:

$$5 \overline{)28} \quad \frac{3}{5}$$

or you can turn the remainder into a decimal like this:

$$5.6 \\ 5 \overline{)28.0}$$

All you do is put a decimal point after the 28 and after the 5 in the answer. Put the 3 which is left over with the 0 in 28.0 and say 3 into 30 goes 6. The answer is 5.6. If necessary, you could have gone on putting 0 after the decimal point until the answer came out exactly - or you ran out of paper, or patience. Look at the "Rounding Off" page in Book 3 (page 33) to see how to deal with the decimals.

If you use a calculator to do division sums you will find that it shows any remainder as decimals. If you find decimals confusing, look at the pages on decimals in Book 3 (pages 19-34).

Fill in the Blanks

Use the Multiplication Square (if you need it).

$12 \div 3 =$

$24 \div 6 =$

$18 \div 9 =$

$27 \div 3 =$

$15 \div 5 =$

$18 \div 6 =$

$25 \div 5 =$

$36 \div 6 =$

$42 \div 7 =$

$63 \div 9 =$

$100 \div 10 =$

$88 \div 8 =$

Divide

$4 \overline{)284}$

$5 \overline{)450}$

$6 \overline{)426}$

$7 \overline{)560}$

$4 \overline{)3916}$

$6 \overline{)600}$

$9 \overline{)819}$

$3 \overline{)153}$

$5 \overline{)205}$

$3 \overline{)451}$

$2 \overline{)184}$

$3 \overline{)999}$

$2 \overline{)246}$

$7 \overline{)497}$

$7 \overline{)6342}$

$2 \overline{)868}$

$6 \overline{)4812}$

$9 \overline{)7218}$

$3 \overline{)586}$

$5 \overline{)732}$

Short Division Problems

1. Four of us went for a Chinese meal. The bill came to £20. How much did we each have to pay?
2. 3lbs of flour cost 52p and 1lb of flour costs 20p. Is it cheaper to buy a 3lb bag or three 1lb bags?
3. Jim saves £5.00 a month. How long will it take him to save £145 for a typewriter.
4. Joan wants to make some shelves to fit in an alcove 3 ft wide. How many shelves can she make out of a plank 8 foot long?
5. Bob needs to lose 10 kilograms. If he manages to lose 2kg a week, how long will it take him to reach his target weight?
6. I brought 2 dozen small bars of chocolate to share between 10 children at a party. How many can each child have? Will there be any left over?
7. A pop music programme on the radio lasts for half an hour. How many records lasting 3 minutes each can be played in that time?
8. George drove 100 miles in 5 days. How far did he go each day on average?
9. At the moment my rent is £95 a month, (4 weeks) and I'm thinking of moving to a slightly bigger flat where the rent is £28 a week. Would I save money if I moved?
10. A pack of 6 bars of soap costs £1.20. How much is that for each bar?

How to Do Long Division

Long division is dividing by numbers which are more than 10, numbers we don't learn tables for.

For example: 575 divided by 25

Set out like this: $25 \overline{)575}$

We break down this large division sum into a few smaller ones.

Start from the beginning of the number with the 5.

Can we divide 25 into 5? Answer No.

Take the next figure, 7, with the 5 to make 57.

Can we divide 25 into 57? Answer Yes.

How many times? Work this out in rough:

$$\text{Is it } 1 \times 25 = 25$$

$$2 \times 25 = 50$$

$$3 \times 25 = 75$$

It must be 2×25 , because this gives the answer nearest to 57 which is not too big. To find how many are left over, subtract 50 from 57. So, 25 into 57 goes 2 times with 7 left over.

The sum so far:

$$\begin{array}{r} 2 \\ 25 \overline{)575} \\ \underline{-50} \\ 7 \end{array}$$

Now we move to the next figure, 5, which joins the 7 to make 75.

$$\begin{array}{r} 2 \\ 25 \overline{)575} \\ \underline{-50} \\ 75 \end{array}$$

How to Do Long Division

CONTINUED

Can we divide 25 into 75? Answer yes. How many times? Work this out as before.

$$1 \times 25 = 25$$

$$3 \times 25 = 75$$

$$2 \times 25 = 50$$

$$4 \times 25 = 100$$

We see that $3 \times 25 = 75$. So 25 goes into 75, 3 times with nothing left over.

Set this out:

$$\begin{array}{r} 23 \\ 25 \overline{) 575} \\ \underline{-50} \\ 75 \\ \underline{-75} \\ 00 \end{array}$$

There are no more figures left in the original number 575, and the sum is finished.
The final answer is:

$$575 \div 25 = 23$$

575 divided by 25 equals 23

or 25 goes into 575 23 times exactly.

Long Division Problems

1. There are 400 seats in the theatre in 25 rows. How many in each row?
2. I ordered 200 rolls for a wedding reception for 50 guests. I reckoned this allowed 3 rolls each. Was I right?
3. In 32 cases there are 768 apples. How many in each case?
4. I have 256 chocolates to pack into 15 boxes. How many in each box? Are there any left over?
5. I have to pack 72 light bulbs in boxes, 24 to each box. How many boxes will I need? Are there any left over?
6. I have to order 500 bottles of beer for a party. They come in crates of 36. How many crates do I need?
7. 500 people are going to a football match. How many coaches do they need to hire, if each coach seats 40 people?
8. I earn £4680 a year. How much is this per week?
9. I want to save about £250 a year. Roughly how much do I need to save each month?

Averages

To find the **average** of a collection of numbers, add together all the numbers then divide by however many numbers there are. For example:

Find the average of 12, 5, 18, 14, 26

First add all the numbers

$$\begin{array}{r} 12 + \\ 5 \\ 18 \\ 14 \\ \underline{26} \\ 75 \end{array}$$

Then divide by 5 because there are 5 numbers.

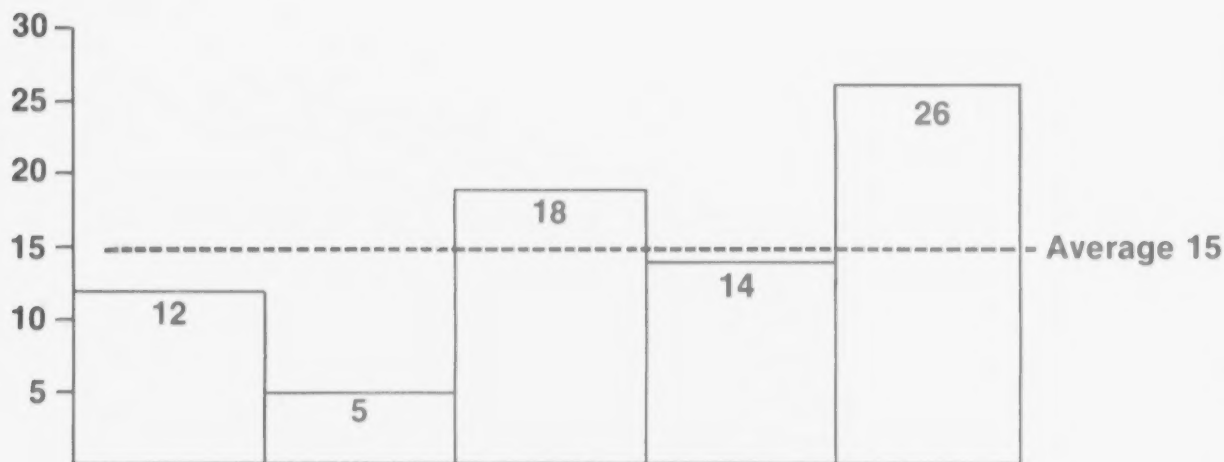
The answer to this sum is the average of all the numbers.

$$\begin{array}{r} 15 \\ 5 \overline{)75} \end{array}$$

The average may not turn out to be a whole number, as it has done here.

The average of 12, 5, 18, 14, and 26 is 15

The average of a collection of numbers levels out all the numbers because it is somewhere between the highest and the lowest number in the group. It gives us an idea of the size of all the numbers. This diagram shows how it works:



Averages

CONTINUED

A footballer's **goal average** is the average number of goals he has scored in all his matches so far. If he has played 8 matches and scored 1, 0, 2, 3, 1, 0, 1, 2 goals in each match his goal average is:

$$\frac{1 + 0 + 2 + 3 + 1 + 0 + 1 + 2}{8} = \frac{10}{8} = 1\frac{1}{4}$$

So, he scores, on average, $1\frac{1}{4}$ goals each match. Obviously, this could not be exactly true, but it does give us an idea how good he is at scoring goals.



Averages Problems

1. A cricketer scores 51, 60, 44, 72, 46, 55 and 60 runs in 7 games. What is his batting average?
2. John is 24. He has 3 brothers aged 14, 9 and 21, and a sister aged 10. What is the average age of all the family?
3. There are 6 classes in Jean's year at school with 32, 38, 41, 29, 40 and 36 children. What is the average size of a class?
4. I bought 6 boxes of matches, and noticed the boxes said 'average contents 48'. I counted the matches in each box and there were 51, 49, 48, 49, 47 and 45. Was the number on the box right?
5. In the end of term exams, Chris got these marks: Maths 67, Science 60, History 70, French 58, English 72. What was his average exam mark?

Average Speeds

If you could travel on a car journey without slowing or stopping, the speedometer would show the same figure all the time – you would be travelling at constant speed. We can do this on motorways, but generally our speed may vary from 70 mph down to 30 mph in towns or even 15 mph in slow heavy traffic. **Average speed** is one way of saying how fast we would be travelling if we could keep the same speed all the way. A high average speed of say 65 mph means that sometimes we were going much faster, say 75 mph, and sometimes as slow as 50 mph. A lower average speed of say 50 mph means that we were generally going slower, and so the journey would take longer.

To work out average speed: take the total distance travelled, and divide by the time taken. For example:

A certain journey took 2 hours 20 mins. The distance travelled was 120 miles. Find the average speed in miles per hour (using the calculator).

distance = 120 miles, time = $2\frac{1}{3}$ hrs = 2.3 hrs

average speed = $120 \div 2.3 = 52.17$ mph, or near enough 52 mph.

Find these average speeds in miles per hour:

1. One of the latest trains travels 450 miles in $3\frac{3}{4}$ hrs.
2. A cyclist travels 46 miles in 1 hr 25 min.
3. A plane flies 3060 miles in $6\frac{1}{2}$ hrs.
4. I'm going on a sponsored walk. If I can walk an average of 4 miles per hour how long will it take me to walk the 21 mile round trip?
5. My 25 miles journey home usually takes $\frac{1}{2}$ hr by train, but in the rush hour by car it takes 50 mins. By how much does my average speed vary?
6. Concorde flies the 3000 miles across the Atlantic in 3 hrs. What is its average speed? How long would Concorde take to fly 4500 miles?

Mixed Sums 1

$$\begin{array}{r} 15 + \\ \underline{12} \end{array}$$

$$\begin{array}{r} 124 + \\ \underline{353} \end{array}$$

$$\begin{array}{r} 25 \times \\ \underline{18} \end{array}$$

$$\begin{array}{r} 205 + \\ \underline{176} \end{array}$$

$$\begin{array}{r} 21 \times \\ \underline{4} \end{array}$$

$$\begin{array}{r} 76 \times \\ \underline{6} \end{array}$$

$$\begin{array}{r} 153 \times \\ \underline{5} \end{array}$$

$$\begin{array}{r} 107 \times \\ \underline{12} \end{array}$$

$$\begin{array}{r} 24 \times \\ \underline{10} \end{array}$$

$$\begin{array}{r} 68 \times \\ \underline{9} \end{array}$$

$$\begin{array}{r} 84 \times \\ \underline{7} \end{array}$$

$$\begin{array}{r} 432 \times \\ \underline{8} \end{array}$$

$$\begin{array}{r} 52 - \\ \underline{21} \end{array}$$

$$\begin{array}{r} 562 - \\ \underline{42} \end{array}$$

$$\begin{array}{r} 258 - \\ \underline{136} \end{array}$$

$$\begin{array}{r} 30 - \\ \underline{18} \end{array}$$

$$\begin{array}{r} 243 - \\ \underline{27} \end{array}$$

$$\begin{array}{r} 160 - \\ \underline{53} \end{array}$$

$$3 \overline{)636}$$

$$4 \overline{)824}$$

$$6 \overline{)642}$$

$$8 \overline{)248}$$

$$3 \overline{)195}$$

$$2 \overline{)6322}$$

Mixed Sums 2

$$\begin{array}{r} 45 + \\ 607 \\ \hline 32 \end{array}$$

$$\begin{array}{r} 7653 + \\ 8924 \\ \hline 3799 \end{array}$$

$$\begin{array}{r} 876 + \\ 4609 \\ \hline 24 \end{array}$$

$$\begin{array}{r} 320 \times \\ \hline 9 \end{array}$$

$$\begin{array}{r} 436 \times \\ \hline 20 \end{array}$$

$$\begin{array}{r} 320 \times \\ \hline 27 \end{array}$$

$$\begin{array}{r} 458 \times \\ \hline 36 \end{array}$$

$$\begin{array}{r} 516 \times \\ \hline 372 \end{array}$$

$$\begin{array}{r} 877 \times \\ \hline 201 \end{array}$$

$$\begin{array}{r} 432 - \\ \hline 327 \end{array}$$

$$\begin{array}{r} 563 - \\ \hline 384 \end{array}$$

$$\begin{array}{r} 710 - \\ \hline 610 \end{array}$$

$$6 \overline{)4632}$$

$$9 \overline{)728}$$

$$11 \overline{)3467}$$

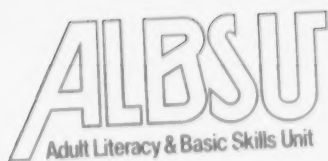
$$15 \overline{)4862}$$

$$26 \overline{)8063}$$

$$44 \overline{)36254}$$



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The Numeracy Pack

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Book 3

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75

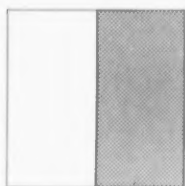
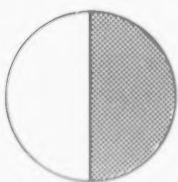
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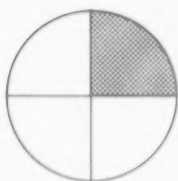
Fractions

Fractions are parts of one. The bottom number tells you how many parts the whole one is split up into and the top number tells you how many of those parts you are concerned with in each case.

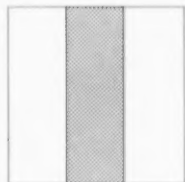
For example $\frac{1}{2}$ means one splits into two equal parts and a half is one of those parts.



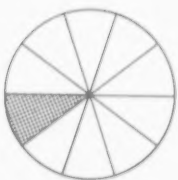
$\frac{1}{2}$ one half



$\frac{1}{4}$ one quarter

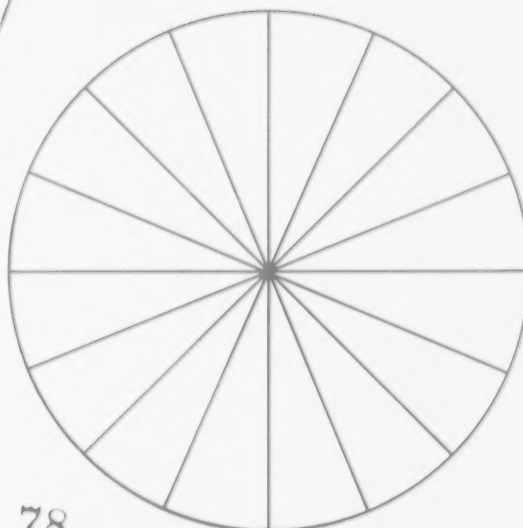
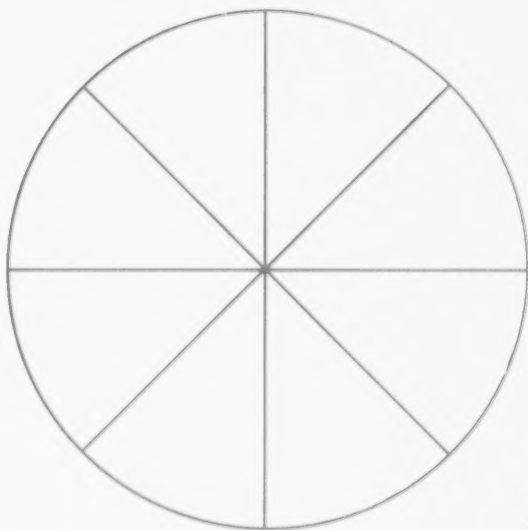
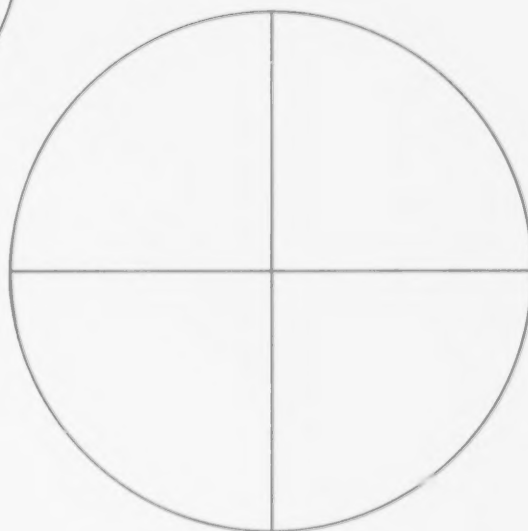
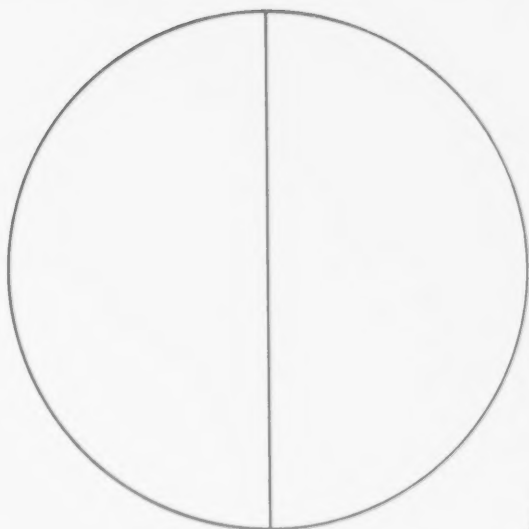


$\frac{1}{3}$ one third



$\frac{1}{10}$ one tenth

Fractions Cut-Out Shapes



Shade in the Fractions

$\frac{1}{2}$	$\frac{1}{2}$
---------------	---------------

$$\frac{1}{2}$$

$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------

$$\frac{3}{10}$$

$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
---------------	---------------	---------------	---------------

$$\frac{3}{4}$$

$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$
---------------	---------------	---------------	---------------	---------------	---------------

$$\frac{5}{6}$$

$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$
---------------	---------------	---------------	---------------	---------------

$$\frac{2}{5}$$

$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$
----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------

$$\frac{5}{12}$$

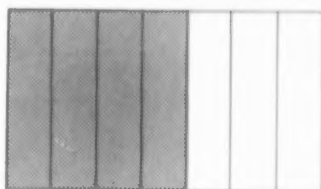
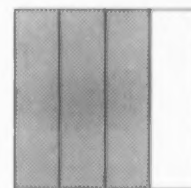
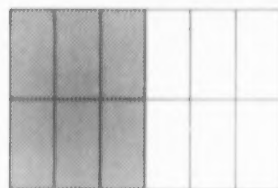
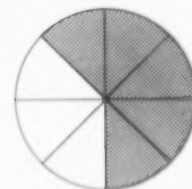
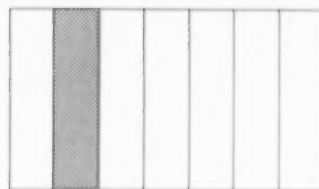
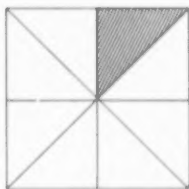
$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$
---------------	---------------	---------------

$$\frac{2}{3}$$

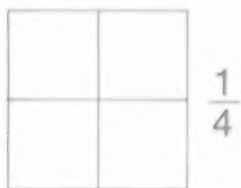
$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$
---------------	---------------	---------------	---------------	---------------

$$\frac{1}{5}$$

Name the Fractions Shaded



Shade in the fractions given

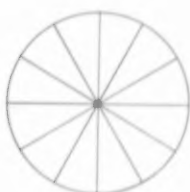


$\frac{1}{4}$

$\frac{5}{6}$



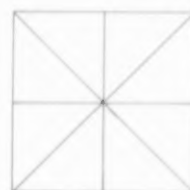
$\frac{7}{8}$



$\frac{1}{12}$



$\frac{1}{6}$



80 $\frac{3}{8}$



$\frac{3}{10}$

Fraction Block:

1, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$

One whole one 1							
One half $\frac{1}{2}$				One half $\frac{1}{2}$			
One quarter $\frac{1}{4}$		$\frac{1}{4}$		$\frac{1}{4}$		$\frac{1}{4}$	
One eighth $\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

one unit 1

two halves $\frac{2}{2}$

four quarters $\frac{4}{4}$

eight eighths $\frac{8}{8}$

What is half of one?

What is half of a half?

What is half of a quarter?

What is a quarter of a half?

How many eighths in one?

How many eighths in a half?

How many quarters in one?

How many quarters in a half?

Fraction Block:

$1, \frac{1}{3}, \frac{1}{6}, \frac{1}{12}$

One whole one											
1											
One third											
$\frac{1}{3}$			$\frac{1}{3}$			$\frac{1}{3}$					
$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$	
one twelfth											
$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$

one unit 1

three thirds $\frac{3}{3}$

six sixths $\frac{6}{6}$

twelve twelfths $\frac{12}{12}$

What is a third of one?

What is a half of a third?

What is a half of a sixth?

How many sixths in one?

How many sixths in a third?

How many twelfths in a third?

How many twelfths in two thirds?

How many twelfths in one?

Fraction Block: 1, $\frac{1}{5}$, $\frac{1}{10}$

One whole one									
1									
One fifth									
$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{5}$	
One tenth									
$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$

one unit 1

five fifths $\frac{5}{5}$

ten tenths $\frac{10}{10}$

What is fifth of one?

What is a half of a fifth?

What is ten tenths?

How many fifths in one?

How many tenths in a fifth?

How many tenths in three fifths?

How many tenths in one?

Changing Fractions: $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$

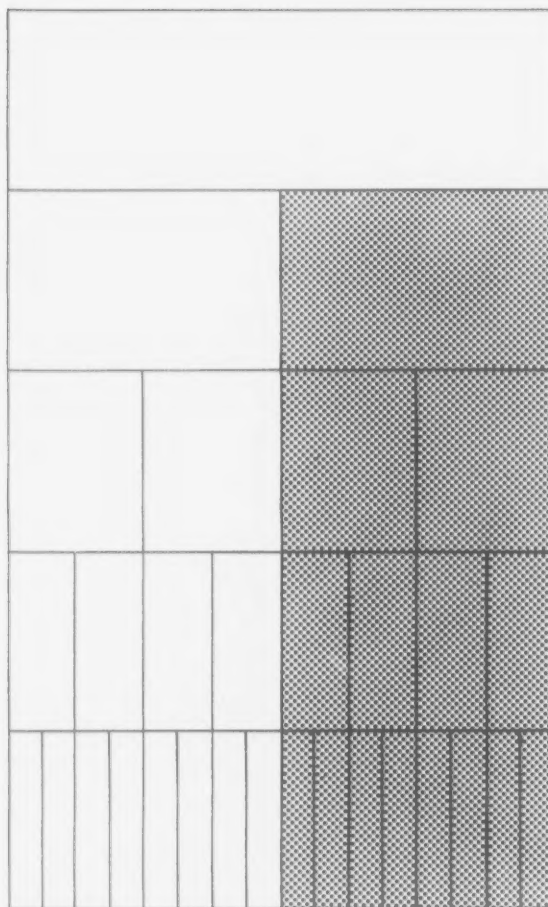
one whole

$$\frac{2}{2} = 2 \text{ halves}$$

$$\frac{4}{4} = 4 \text{ quarters}$$

$$\frac{8}{8} = 8 \text{ eighths}$$

$$\frac{16}{16} = 16 \text{ sixteenths}$$



$$\frac{1}{2}$$

$$\frac{2}{4} = \frac{1}{2}$$

$$\frac{4}{8} = \frac{2}{4} = \frac{1}{2}$$

$$\frac{8}{16} = \frac{4}{8} = \frac{2}{4} = \frac{1}{2}$$

Complete these

$$\frac{1}{4} = \frac{\quad}{8} = \frac{\quad}{16}$$

$$\frac{3}{4} = \frac{\quad}{8} = \frac{\quad}{16}$$

$$\frac{1}{2} = \frac{\quad}{4} = \frac{\quad}{8} = \frac{\quad}{16}$$

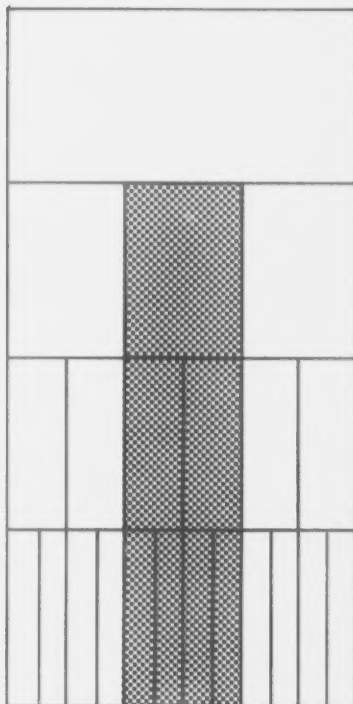
Changing Fractions: $\frac{1}{3}$, $\frac{1}{6}$, $\frac{1}{12}$ and $\frac{1}{5}$, $\frac{1}{10}$

One whole

$$\frac{3}{3} = 3 \text{ thirds}$$

$$\frac{6}{6} = 6 \text{ sixths}$$

$$\frac{12}{12} = 12 \text{ twelfths}$$



$$\frac{1}{3}$$

$$\frac{2}{6} = \frac{1}{3}$$

$$\frac{4}{12} = \frac{2}{6} = \frac{1}{3}$$

Complete these:

$$\frac{1}{6} = \frac{\quad}{12}$$

$$\frac{5}{6} = \frac{\quad}{12}$$

$$\frac{2}{3} = \frac{\quad}{6} = \frac{\quad}{12}$$

One whole

$$\frac{5}{5} = 5 \text{ fifths}$$

$$\frac{10}{10} = 10 \text{ tenths}$$



$$\frac{1}{5}$$

$$\frac{2}{10} = \frac{1}{5}$$

Complete these:

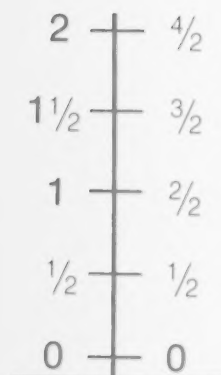
$$\frac{2}{5} = \frac{\quad}{10}$$

$$\frac{3}{5} = \frac{\quad}{10}$$

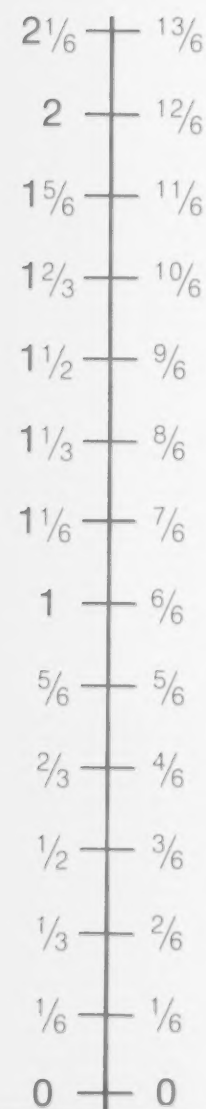
$$\frac{8}{10} = \frac{\quad}{5}$$

$$\frac{7}{5} = \frac{\quad}{10}$$

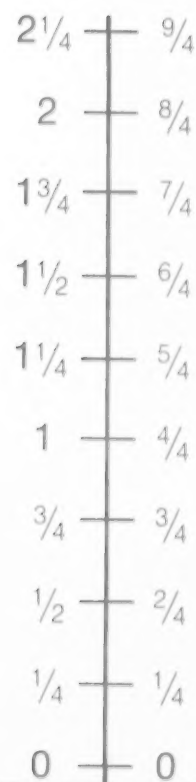
Fractions Number Line



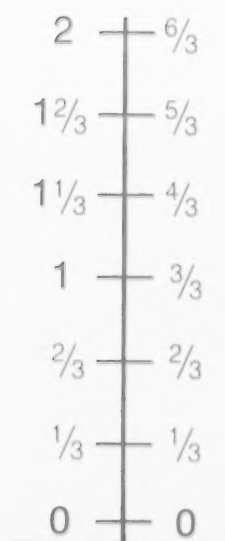
Halves



Sixths



Quarters



Thirds

Mixed Fractions $+$ $-$ $\times$ $\div$

1. $\frac{1}{4} \div 5$

9. $2 + \frac{2}{5}$

2. $\frac{1}{2} + \frac{2}{3} - \frac{3}{4}$

10. $1\frac{2}{3} - 4\frac{7}{8} + 4\frac{5}{6}$

3. $1\frac{1}{2} \times \frac{1}{3}$

11. $1\frac{3}{7} \div 3\frac{4}{7}$

4. $\frac{5}{8} \div \frac{2}{3}$

12. $\frac{15}{16} \times \frac{6}{10}$

5. $3 - 1\frac{1}{9}$

13. $1 + \frac{1}{2}$

6. $\frac{2}{3} \times 2$

14. $\frac{1}{6} \times 5$

7. $1 - \frac{1}{4}$

15. $2\frac{2}{9} + 1\frac{5}{6} + 1\frac{1}{3}$

8. $3\frac{1}{3} + 2\frac{2}{3}$

16. $2\frac{1}{16} \div 4\frac{5}{9}$

How to Add Fractions

You can only add together fractions which have the same number at the bottom. If the fractions are already like this, then just add the top numbers.

For example:

$$\frac{3}{5} + \frac{1}{5} = \frac{4}{5}$$

$$\frac{1}{8} + \frac{3}{8} = \frac{4}{8} = \frac{1}{2}$$

Try these:

$$\frac{1}{4} + \frac{1}{4}$$

$$\frac{2}{7} + \frac{4}{7}$$

$$\frac{3}{10} + \frac{7}{10}$$

$$\frac{1}{9} + \frac{1}{9}$$

When fractions are different: If the bottom numbers are different, we must change one or both fractions so the bottom numbers are the same, (this can be called finding the common denominator), and then add.

For example:

$$\frac{1}{4} + \frac{3}{8} = \frac{2+3}{8} = \frac{5}{8}$$

Here, we have changed one of the fractions, $\frac{1}{4} = \frac{2}{8}$, so we can add $\frac{3}{8}$

Another example:

$$\frac{1}{4} + \frac{2}{3} = \frac{3+8}{12} = \frac{11}{12}$$

Here we have to change both quarters and thirds to twelfths before they can be added, 12 is the common denominator. It is the smallest number we can use in this case. This is how we change the fractions:

What do you need to multiply 4 by to get 12? Answer 3, so multiply the top line by 3.

$$\text{So } \frac{1}{4} = \frac{3}{12}$$

Similarly, what do you multiply 3 by to get 12? Answer 4, so multiply the top line by 4.

$$\frac{2}{3} = \frac{8}{12}$$

Now try these:

$$\frac{2}{3} + \frac{1}{6}$$

$$\frac{2}{3} + \frac{1}{2}$$

$$\frac{3}{4} + \frac{5}{8}$$

$$\frac{1}{5} + \frac{2}{3}$$

$$\frac{5}{6} + \frac{1}{9}$$

Whole numbers and fractions (Mixed numbers)

$$2\frac{3}{4} + 3\frac{1}{2} = 11\frac{1}{4} + 7\frac{1}{2} = \frac{11+14}{4} = \frac{25}{4} = 6\frac{1}{4}$$

When we have whole numbers and fractions together, before we can add, we change these mixed numbers into improper fractions (the top number is bigger than the bottom number).

So $2\frac{3}{4} = 11\frac{1}{4}$ and $3\frac{1}{2} = 7\frac{1}{2}$. Then find the common denominator and add.

Try these:

$$1\frac{1}{4} + 3\frac{1}{3}$$

$$2\frac{2}{5} + 4\frac{3}{10}$$

$$1\frac{3}{8} + 2\frac{1}{4}$$

$$6\frac{2}{3} + 2\frac{1}{2}$$

How to Take Away Fractions

Like adding, you can take away fractions which have the same number at the bottom. The first fraction must be bigger than the second one.

When the bottom numbers are already the same, just take away the top numbers.

For example: $\frac{3}{5} - \frac{1}{5} = \frac{2}{5}$ $\frac{3}{8} - \frac{1}{8} = \frac{2}{8} = \frac{1}{4}$

Try these: $\frac{3}{4} - \frac{1}{4}$ $\frac{5}{8} - \frac{3}{8}$ $\frac{6}{7} - \frac{1}{7}$ $\frac{2}{3} - \frac{1}{3}$ $\frac{9}{10} - \frac{3}{10}$

When fractions are different: If the bottom numbers are different, we must change one or both fractions so the bottom numbers are the same (find the common denominator), and then take away.

For example: $\frac{5}{8} - \frac{1}{4} = \frac{5}{8} - \frac{2}{8} = \frac{3}{8}$

Here, we have changed one of the fractions, $\frac{1}{4} = \frac{2}{8}$, so we can take it away from $\frac{5}{8}$

Another example: $\frac{2}{3} - \frac{1}{4} = \frac{8}{12} - \frac{3}{12} = \frac{5}{12}$

Here, as for adding up, we have to change both thirds and quarters to twelfths (the common denominator) before we can take away.

Now try these:

$\frac{5}{6} - \frac{1}{3}$ $\frac{2}{3} - \frac{1}{2}$ $\frac{3}{4} - \frac{5}{8}$ $\frac{3}{5} - \frac{1}{3}$ $\frac{3}{4} - \frac{2}{5}$

Whole numbers and fractions (Mixed numbers)

$3\frac{1}{2} - 1\frac{3}{4} = \frac{7}{2} - \frac{7}{4} = \frac{14}{4} - \frac{7}{4} = \frac{7}{4} = 1\frac{3}{4}$

Before we can take away, we must change the mixed numbers into improper fractions (the top number is bigger than the bottom number):

$3\frac{1}{2} = \frac{7}{2}$ (seven halves) $1\frac{3}{4} = \frac{7}{4}$ (seven quarters)

Then find the common denominator and take away.

Try these: $2\frac{1}{4} - 1\frac{3}{4}$ $4\frac{1}{8} - 2\frac{1}{4}$ $3\frac{6}{7} - 1\frac{3}{14}$ $6\frac{3}{10} - 2\frac{4}{5}$

How to Multiply Fractions

Multiplying fractions is easy:

$$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

Do the top line first.

Say $1 \times 1 = 1$

Then do the bottom line

Say $2 \times 2 = 4$

Answer $\frac{1}{4}$ a quarter

The multiplication sign ($\times$) is another way of saying 'of' so you could say:

$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$ a half of a half is a quarter

Now try these:

$$\frac{1}{2} \times \frac{1}{4} =$$

$$\frac{1}{2} \times \frac{1}{8} =$$

$$\frac{1}{2} \times \frac{1}{6} =$$

$$\frac{1}{2} \times \frac{1}{3} =$$

$$\frac{1}{3} \times \frac{1}{4} =$$

$$\frac{1}{5} \times \frac{1}{3} =$$

Multiplying Fractions

$$\frac{2}{3} \times \frac{3}{5} =$$

$$\frac{4}{5} \times \frac{3}{4} =$$

$$\frac{2}{3} \times \frac{3}{4} =$$

$$\frac{1}{4} \times \frac{7}{8} =$$

$$\frac{7}{8} \times \frac{4}{9} =$$

$$\frac{9}{10} \times \frac{2}{5} =$$

$$\frac{3}{5} \times \frac{1}{3} =$$

$$\frac{2}{9} \times \frac{1}{2} =$$

$$\frac{3}{7} \times \frac{1}{5} =$$

$$\frac{4}{9} \times \frac{1}{3} =$$

$$\frac{1}{10} \times \frac{3}{16} =$$

$$\frac{4}{13} \times \frac{2}{3} =$$

How to Divide Fractions

Once you can multiply fractions,
dividing them is easy,

$$\frac{1}{4} \div \frac{1}{3} =$$

Before you do anything else change
÷ to × and turn $\frac{1}{3}$ upside down
to give you $\frac{3}{1}$

so it looks like this:

$$\frac{1}{4} \times \frac{3}{1} =$$

Now you can do it as a
multiplication sum.

Do the top line first

$$1 \times 3 = 3$$

Then the bottom line

$$4 \times 1 = 4$$

Answer $\frac{3}{4}$ three quarters

Now try these:

$$\frac{1}{5} \div \frac{1}{3} =$$

$$\frac{1}{6} \div \frac{1}{5} =$$

$$\frac{1}{3} \div \frac{2}{9} =$$

$$\frac{1}{9} \div \frac{1}{2} =$$

$$\frac{2}{7} \div \frac{1}{2} =$$

$$\frac{1}{2} \div \frac{5}{7} =$$

Dividing Fractions

$$\frac{3}{5} \div \frac{1}{2} =$$

$$\frac{1}{9} \div \frac{3}{4} =$$

$$\frac{3}{4} \div \frac{2}{3} =$$

$$\frac{8}{9} \div \frac{4}{5} =$$

$$\frac{1}{3} \div \frac{5}{8} =$$

$$\frac{4}{7} \div \frac{2}{3} =$$

$$\frac{2}{5} \div \frac{3}{8} =$$

$$\frac{4}{5} \div \frac{1}{2} =$$

$$\frac{3}{7} \div \frac{2}{9} =$$

$$\frac{4}{9} \div \frac{5}{9} =$$

Which is the Bigger Fraction?

It is not always easy to see which is the bigger in a group of fractions. It is important to know which is the bigger, however, especially when you are taking away one fraction from another, when you need to put the bigger fraction first and take the smaller fraction away from it.

To find out which is the bigger fraction you must change them so that they have the same number at the bottom.

For example:

$$\frac{1}{2} \quad \frac{1}{4} \quad \text{which is bigger?}$$

Remember that the larger the number at the bottom, the smaller the fraction (if the number at the top is the same).

Change $\frac{1}{2}$ into $\frac{2}{4}$ by multiplying by 2 top and bottom.

You can now see that $\frac{2}{4}$ is bigger than $\frac{1}{4}$

Which is the biggest in these groups of fractions?

$$\frac{1}{2} \quad \frac{3}{4} \quad \frac{1}{5}$$

$$\frac{3}{10} \quad \frac{2}{3} \quad \frac{4}{9}$$

$$\frac{1}{8} \quad \frac{1}{4} \quad \frac{1}{2}$$

Simplifying Fractions

Simplifying fractions is a way of making awkward fractions easier to handle. For instance,

$\frac{14}{49}$ can be simplified to $\frac{2}{7}$ by dividing the top number (14),

and the bottom number (49), by 7.

You choose the number to divide by and it must be a number which will go exactly into both top and bottom numbers of the fractions.

In this case $14 \div 7 = 2$ and $49 \div 7 = 7$ so you get the answer $\frac{2}{7}$

Sometimes you'll find the fraction you get after simplifying can be simplified still further as in this example:

$$\frac{36}{72}$$

If you choose to divide by 6 you say $36 \div 6 = 6$ and $72 \div 6 = 12$ and get the fraction

$$\frac{6}{12}$$

$\frac{6}{12}$ can be simplified by saying $6 \div 6 = 1$ and $12 \div 6 = 2$, so the answer is $\frac{1}{2}$

Now try simplifying these fractions:

$$\frac{2}{10}$$

$$\frac{3}{9}$$

$$\frac{5}{15}$$

$$\frac{6}{48}$$

$$\frac{4}{24}$$

$$\frac{8}{16}$$

$$\frac{5}{20}$$

$$\frac{9}{45}$$

$$\frac{7}{56}$$

$$\frac{16}{32}$$

$$\frac{25}{55}$$

$$\frac{77}{99}$$

Whole Numbers and Fractions

Addition

When a sum includes a whole number and a fraction, like this:

$$1\frac{1}{2} + 2\frac{1}{3} =$$

you can simply add 1 and 2, making 3, and then add the fractions in the usual way, like this:

$$3 \frac{3+2}{6} = 3 \frac{5}{6}$$

Take away, multiplication and division

If the sum is take away, multiply or divide, it's safer to turn the fraction and whole number into a top-heavy fraction (called an improper fraction)

Look at this sum: $2\frac{1}{2} \times 1\frac{2}{3} =$

The first thing to do is to change the $2\frac{1}{2}$ and the $1\frac{2}{3}$ into improper fractions. Do that like this:

$2\frac{1}{2}$ You need to find the number of $\frac{1}{2}$ s in $2\frac{1}{2}$

To do that you say $2 \times 2 = 4$ (this gives you the number of $\frac{1}{2}$ s in 2)

Then add 1 for the extra $\frac{1}{2}$. This makes 5 halves in $2\frac{1}{2}$.

So $2 \times 2 = 4$ and $4 + 1 = 5$ and $2\frac{1}{2} = \frac{5}{2}$

Now change $1\frac{2}{3}$ into an improper fraction.

$1\frac{2}{3}$ You need to find the number of $\frac{1}{3}$ s in $1\frac{2}{3}$

To do that you say $3 \times 1 = 3$ (this gives you the number of $\frac{1}{3}$ s in 1)

Then add 2 for the extra $\frac{2}{3}$, this makes 5 thirds in $1\frac{2}{3}$

So $3 \times 1 = 3$ and $3 + 2 = 5$ and $1\frac{2}{3} = \frac{5}{3}$

Now you can do the sum in the usual way:

$$2\frac{1}{2} \times 1\frac{2}{3} = \frac{5}{2} \times \frac{5}{3} = \frac{25}{6}$$

To turn $\frac{25}{6}$ into a whole number and fraction you work out $25 \div 6 = 4\frac{1}{6}$

So the answer is $4\frac{1}{6}$

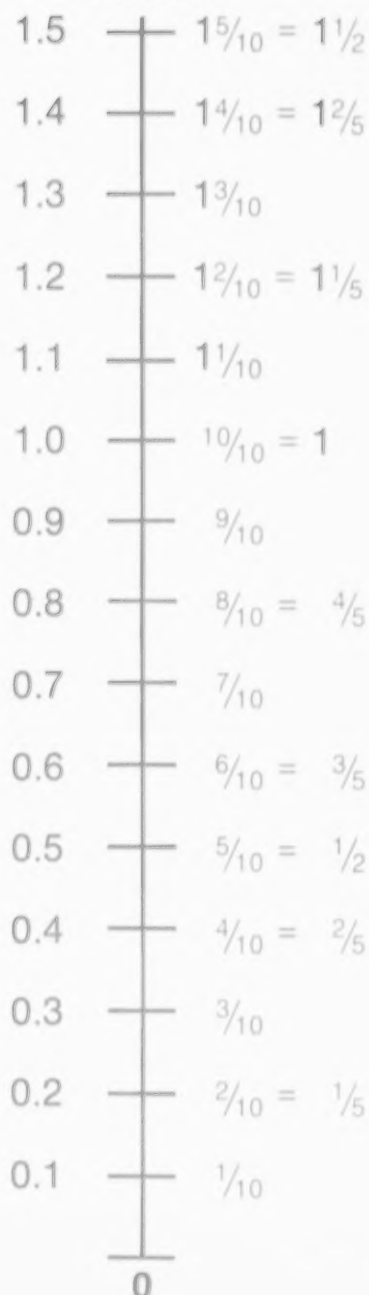
Fractions Problems

As the old measurements are phased out, fractions will be used less and less. Here are a few problems where a knowledge of fractions is still required.

1. If 1 lb of cheese is shared between 4 people, how much will they each have?
2. Mrs Popat has 5 children. She buys 2 bars of chocolate to share between them. Each bar has 6 pieces. What is the fairest way to share out the chocolate?
3. I want to knit a scarf measuring 20cm wide. My tension is $4\frac{1}{2}$ stitches to 5cm. How many stitches must I cast on?
4. In pubs whisky is sold in quantities of $\frac{1}{6}$ of a gill. It used to be sold in $\frac{1}{5}$ of a gill. Did you get more or less in the "good old days"? How much whisky do you get if you order a double?
5. My recipe book shows $\frac{1}{2}$ lb of flour, $\frac{1}{4}$ lb fat, salt and water as the ingredients for short crust pastry. I want to make double the quantity - what should I do?
6. Mr Ali gets time and a half when he works overtime on Saturdays. His usual rate is £2.90 an hour for a 40 hour week. If he works a full 8 hour shift on Saturday, how much will he take home that week?
7. I was a quarter of an hour late for an appointment, and then had to spend half an hour looking for somewhere to park. How late was I in the end?

Decimals and Fractions

Tenths

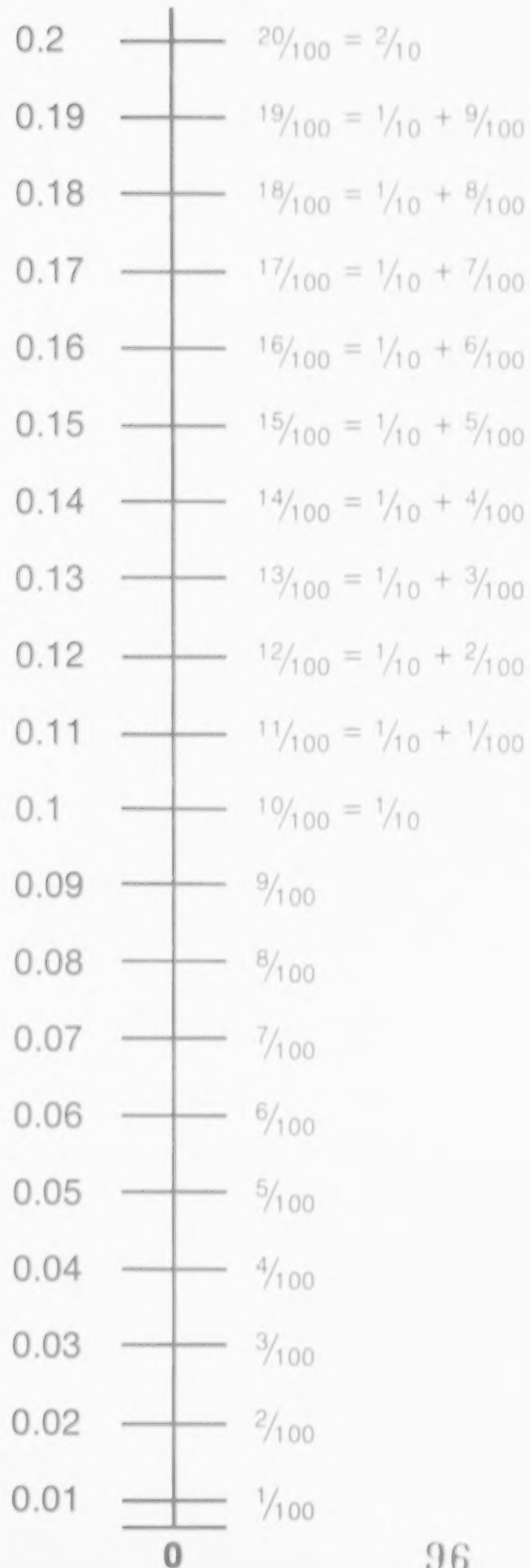


Decimals are just another way of expressing fractions.

0.1 is the same as $\frac{1}{10}$

Decimals and Fractions

Hundredths



Place Value: Decimals

Decimals are part of the Place Value system (see Book 1, page 24). A decimal number is any number to the right of the decimal point. Any number in this position is worth less than one. "Decimal" is really short for "decimal fraction" - decimals are just another way of expressing fractions or parts of one. Decimal fractions are tenths, hundredths, thousandths, and so on. The first number to the right of the decimal point is a number of tenths, the second number is a number of hundredths and so on.

Fit the numbers below into the correct place on the Place Value chart (the first one is done for you).

	Tens	Units	Tenths	Hundredths	
	T	U	$\frac{1}{10}$	$\frac{1}{100}$	
24.25	2	4	2	5	twenty-four point two five
69.16					
38.49					
60.23					
35.49					
51.26					
19.35					
28.16					
94.57					
6.82					
38.29					

Which is Bigger: Decimals

1. 0.2 or 0.02
2. 3.14 or 31.4
3. 0.6 or 0.3
4. 7.08 or 7.8
5. 3.6 or 3.64
6. 0.05 or 0.005
7. 3.1 or 3.11
8. 0.2 or 0.04
9. 0.54 or 0.504
10. 0.04 or 5.3
11. 8.6 or 5.3
12. 3.79 or 3.709
13. 2.8 or 2.75
14. 7.1 or 5.06
15. 0.006 or 0.0032
16. 17.6 or 17.623
17. 20.1 or 20.004

Write these Numbers

1. twenty-eight point one
2. thirty-two point four
3. sixty-nine point two five
4. three hundred and twenty-one point three
5. seventy-nine
6. two point 0 five
7. one hundred and three point 0 two
8. ninety-seven point 0 six
9. two hundred and forty-eight point four
10. eleven point 0 seven nine
11. thirty-five point 0 0 seven
12. three hundred and forty-five
13. fifty-five point 0 five
14. eighteen point two four six
15. sixteen point 0 seven
16. ninety-eight
17. one hundred and three point two
18. four hundred and eleven point eight
19. forty-seven point 0 0 three
20. seventeen point 0 six

Place Value: Decimal Chart

Whole numbers

Fractions — numbers less than one

Position of decimal point

← Bigger

→ Smaller

	100s hundreds	10s tens	1s units	$\frac{1}{10}$ s tenths	$\frac{1}{100}$ s hundredths	$\frac{1}{1000}$ s thousandths
$\frac{1}{10} = 0.1$			0	1		
$\frac{1}{100} = 0.01$			0	0	1	
$\frac{1}{1000} = 0.001$			0	0	0	1

There is one number in each column to show the value of that number

Multiplying and Dividing Decimals by 10 and by 100

Multiplying and dividing decimals by 10, 100 or 1000 is nowhere near as hard as it looks.

You need to remember how the Place Value system works with whole numbers since decimals work in exactly the same way, and are part of the same system. Look at this example:

$$5 \times 10 = 50$$

the 5 moves one place to the left and is worth ten times what it meant in the Units column.

The same thing happens when the number being multiplied is 0.5

$$0.5 \times 10 = 5$$

the 5 has moved one place to the left and has become 5 Units rather than $\frac{5}{10}$

If we multiply by 100 the number or numbers move two places to the left, like this:

$$2 \times 100 = 200$$

and

$$0.2 \times 100 = 20$$

When dividing, you move the numbers to the right instead of to the left, so:

$$40 \div 10 = 4$$

and:

$$4 \div 10 = 0.4$$

$$0.4 \div 10 = 0.04$$

$$0.04 \div 100 = 0.0004$$

Try these multiplication and division sums:

$$2.5 \times 10 =$$

$$5.9 \times 100 =$$

$$6.3 \times 10 =$$

$$1.8 \times 10 =$$

$$3.5 \div 10 =$$

$$7.8 \div 100 =$$

$$27.4 \times 100 =$$

$$50.3 \times 10 =$$

$$45.7 \div 10 =$$

$$190.2 \times 10 =$$

$$70.1 \div 10 =$$

$$640.5 \times 10 =$$

$\times 10, 100 \text{ and } 1000$

When you multiply by 10 just move the figures one place to the left.

When you multiply by 100 just move the figures two places to the left.

When you multiply by 1000 just move the figures three places to the left.

Remember, the figures may have to jump over the decimal point.

1. $10 \times 10 =$
2. $69 \times 10 =$
3. $148 \times 100 =$
4. $32 \times 10 =$
5. $51 \times 1000 =$
6. $78.5 \times 100 =$
7. $20.25 \times 10 =$
8. $72.1 \times 100 =$
9. $4.38 \times 100 =$
10. $16.5 \times 100 =$
11. $5.94 \times 10 =$
12. $17.1 \times 10 =$
13. $0.06 \times 100 =$
14. $3.002 \times 100 =$
15. $2.15 \times 1000 =$
16. $48.7 \times 100 =$
17. $12.6 \times 10 =$
18. $192.5 \times 100 =$
19. $36.4 \times 1000 =$
20. $4.29 \times 10 =$

$\div 10, 100, 1000$

When you divide by 10 just move the figures one place to the right.

When you divide by 100 just move the figures two places to the right.

When you divide by 1000 just move the figures three places to the right.

Remember, the figures may have to jump over the decimal point.

1. $160 \div 10 =$
2. $200 \div 100 =$
3. $40 \div 1000 =$
4. $390 \div 10 =$
5. $45 \div 10 =$
6. $18 \div 10 =$
7. $98 \div 100 =$
8. $28.6 \div 10 =$
9. $35.5 \div 100 =$
10. $11.2 \div 1000 =$
11. $120 \div 10 =$
12. $17.5 \div 100 =$
13. $149.6 \div 10 =$
14. $528.2 \div 10 =$
15. $39.25 \div 1000 =$
16. $14.86 \div 10 =$
17. $439.2 \div 1000 =$
18. $205.6 \div 100 =$
19. $78.06 \div 10 =$
20. $13.05 \div 1000 =$

Write these Sums in Words (Fractions and Decimals)

$$\frac{3}{4} + \frac{3}{8} = 1\frac{1}{8}$$

$$5.4 \div 9 = 0.6$$

$$3\frac{5}{6} = \frac{23}{6}$$

$$3.6 = \frac{36}{10}$$

$$2\frac{6}{7} - \frac{5}{7} = 2\frac{1}{7}$$

$$\frac{1}{10} + \frac{2}{100} = 0.12$$

Fractions and Decimals

Write these sentences using numbers and signs instead of words.

1. Five point three is the same as five and three tenths.
2. Three point three four plus nought point two one makes three point five five.
3. Four and four-fifths minus nine tenths leaves three and nine tenths.
4. Twenty-five quarters equals six and a quarter.
5. Two thirds times three-eighths equals six twenty-fourths.
6. Twenty-two point three six minus nine point seven leaves twelve point six six.
7. One third divided by five eighths is the same as one third times eight fifths.
8. Thirty-two hundredths equals nought point three two.

How to Add Decimals

Just remember to keep the decimal points lined up underneath each other.

For example: $0.5 + 0.25$

Set it up like this:

$$\begin{array}{r} 0.50 + \\ 0.25 \\ \hline \end{array}$$

(you can always put an extra 0 in a gap to keep the columns in line).

Then you just do it like an ordinary adding-up sum.

$$\begin{array}{r} 0.50 + \\ 0.25 \\ \hline 0.75 \end{array}$$

The decimal point goes underneath the other decimal points and the answer is 0.75

You say: nought point seven-five, never nought point seventy-five, because that makes it sound like a whole number.

Now try these:

$$\begin{array}{r} 0.25 + \\ 0.25 \\ \hline \end{array}$$

$$\begin{array}{r} 0.75 + \\ 0.50 \\ \hline \end{array}$$

$$\begin{array}{r} 0.25 + \\ 0.75 \\ \hline \end{array}$$

$$\begin{array}{r} 0.80 + \\ 0.91 \\ \hline \end{array}$$

$$\begin{array}{r} 0.35 + \\ 0.25 \\ \hline \end{array}$$

$$\begin{array}{r} 0.78 + \\ 0.36 \\ \hline \end{array}$$

How to Take Away Decimals

As with adding-up decimals the important thing is to keep the decimal points lined up underneath each other.

The only thing you have to be careful of is that, as in any ordinary take-away sum, you must have the bigger number on top.

For example:

$$0.75 - 0.25$$

Look at the number on the right next to the decimal point, 7 is a bigger number than 2, so set it out like this:

$$\begin{array}{r} 0.75- \\ \underline{0.25} \\ \hline \end{array}$$

Then do it like an ordinary take-away sum.

$$\begin{array}{r} 0.75- \\ \underline{0.25} \\ 0.50 \end{array}$$

Put the decimal point in your answer under the other decimal points.

The answer is 0.50 or just 0.5

You say: nought point five

Now try these:

$$\begin{array}{r} 0.50- \\ \underline{0.25} \\ \hline \end{array}$$

$$\begin{array}{r} 0.75- \\ \underline{0.50} \\ \hline \end{array}$$

$$\begin{array}{r} 0.25- \\ \underline{0.10} \\ \hline \end{array}$$

$$\begin{array}{r} 0.78- \\ \underline{0.35} \\ \hline \end{array}$$

$$\begin{array}{r} 0.92- \\ \underline{0.50} \\ \hline \end{array}$$

$$\begin{array}{r} 0.63- \\ \underline{0.47} \\ \hline \end{array}$$

Decimals Add and Take Away

$$\begin{array}{r} 5.01 + \\ \underline{3.56} \end{array}$$

$$\begin{array}{r} 0.80 + \\ 6.07 \\ \underline{0.90} \end{array}$$

$$\begin{array}{r} 2.312 + \\ 0.041 \\ \underline{1.206} \end{array}$$

Set down in columns and add:

$$0.48 + 6.9 + 0.07$$

$$2.06 + 3.5 + 4.44$$

$$12.75 + 0.9 + 8.67$$

$$0.6007 + 0.089 + 2.5$$

$$\begin{array}{r} 5.06 \\ \underline{4.07} - \end{array}$$

$$\begin{array}{r} 3.30 \\ \underline{1.05} - \end{array}$$

$$\begin{array}{r} 2.280 \\ \underline{0.028} - \end{array}$$

$$\begin{array}{r} 7.30 \\ \underline{6.91} - \end{array}$$

Take away the smaller number from the larger.

$$7 \text{ and } 4.6$$

$$3.02 \text{ and } 0.801$$

$$0.75 \text{ and } 0.9$$

$$0.093 \text{ and } 0.41$$

$$0.6 \text{ and } 0.37$$

$$1.03 \text{ and } 0.993$$

$$2.01 \text{ and } 0.83$$

How to Multiply Decimals

To multiply a decimal number by a whole number

Look at these sums:

$$\begin{array}{r} 12 \\ 3 \times \\ \hline 36 \end{array}$$

whole numbers

$$\begin{array}{r} 12 \\ 0.3 \times \\ \hline 3.6 \end{array}$$

one decimal place

$$\begin{array}{r} 12 \\ 0.03 \times \\ \hline 0.36 \end{array}$$

two decimal places

The only difference is the position of the decimal point.

Count the number of figures after the point, and put the point in the same place in the answer (counting from the right).

Try these: 15×0.5 24×9.8 152×2.7 260×1.23

To multiply two decimal numbers

3.4×0.6 Make a guess at the result so you can check your answer. To do this, round the numbers off to the nearest whole ones - here $3 \times 1 = 3$

To work out exactly: first ignore the decimal points, and work the sum in the usual way. Then put back the point in the answer by counting the number of decimal places in **both** numbers.

$$\begin{array}{r} 3.4 \\ 0.6 \times \\ \hline 2.04 \end{array}$$

$$\begin{array}{r} 34 \\ 6 \times \\ \hline 204 \end{array}$$

Here there are two numbers after the point, so there must be the same in the answer, counting from the right. The answer is 2.04.

Always check your answer against the guess you made at the start.

Let's try 31.23×1.7

Rough guess: $31 \times 2 = 62$

Work it out this way:

$$\begin{array}{r} 3123 \\ 17 \times \\ \hline 31230 \\ 21861 \\ \hline 53091 \end{array}$$

$$\begin{array}{r} 31.34 \\ 1.7 \times \\ \hline 53.091 \end{array}$$

3 decimal places

The exact answer is 53.091 because there are 3 figures after the point in the sum, so there must be 3 figures after the point in the answer.

Now try these: 15.1×2.3

84.6×0.7

124.2×3.06

25.63×1.3

181.64×0.03

16.02×3.11

How to Divide Decimals

To divide a decimal by a whole number, as in this example,

$$9 \overline{) 27.09}$$

estimate your answer before you start. In this case $27 \div 9 = 3$ so you know the answer will be 3 whole ones and a decimal.

Now just work through the sum in the usual way, taking care to keep the decimal point in the answer lined up with the decimal point in the number you are dividing (27.09). You should get the answer 3.01.

To divide a decimal by a decimal, as in this example,

$$3.2 \overline{) 6.4}$$

again, estimate first, using whole numbers. $6 \div 3 = 2$, so you know before you start the answer will be 2, possibly with a decimal.

To work out the exact answer you must change the numbers you are dividing by into a whole number to make it easier to handle. To do this you look at the sum and see how many decimal places there are in the number you are dividing by (3.2). In this case there is one decimal place (.2) so you must multiply by 10. This will give you a whole number (32) to divide by, rather than a whole number and a decimal. If the number you were dividing by had had two decimal places in it instead of one, then you would have multiplied by 100 and so on.

Now multiply the number you are dividing (6.4) by 10. It's most important that you multiply both the 3.2 and the 6.4 by the same number. As long as you do the same thing to both parts of the sum the proportions remain the same.

Now re-write the sum

$$32 \overline{) 64}$$

Now just work it out in the usual way as a long division sum. The answer is 2.

This may seem strange but try it and see.

Now try these:

$$4.2 \overline{) 8.4}$$

$$2.5 \overline{) 12.5}$$

107

$$1.2 \overline{) 8.412}$$

Decimals Multiply and Divide

$$\begin{array}{r} 6.4 \times \\ 7 \end{array}$$

$$\begin{array}{r} 8.13 \times \\ 9 \end{array}$$

$$\begin{array}{r} 32.04 \times \\ 6 \end{array}$$

$$\begin{array}{r} 3.6 \times \\ 1.4 \end{array}$$

$$\begin{array}{r} 18.3 \times \\ 0.6 \end{array}$$

$$\begin{array}{r} 31.5 \times \\ 0.02 \end{array}$$

$$\begin{array}{r} 16.37 \times \\ 2.4 \end{array}$$

$$\begin{array}{r} 19.32 \times \\ 4.4 \end{array}$$

$$\begin{array}{r} 8.007 \times \\ 3.4 \end{array}$$

$$\begin{array}{r} 92.6 \times \\ 3.25 \end{array}$$

$$\begin{array}{r} 7.063 \times \\ 2.3 \end{array}$$

$$4 \overline{) 0.216}$$

$$7 \overline{) 0.504}$$

$$9 \overline{) 3.87}$$

$$0.4 \overline{) 4.8}$$

$$0.5 \overline{) 3.05}$$

$$1.1 \overline{) 25.3}$$

$$0.6 \overline{) 0.084}$$

$$2.1 \overline{) 44.1}$$

$$1.8 \overline{) 57.8}$$

Rounding Off

Rounding off is a way of making awkward numbers easier to handle. You must decide how accurate you need to be in each case when rounding off. For example, when shopping in the supermarket you don't want to find you've got more goods in your basket than you can afford to pay for. If you've got a calculator you could add up the prices as you go round the shop, but if you are adding things up in your head it's a lot easier if you round all the prices up to the next 10p, so 65p becomes 70p, £5.90 becomes £6.00 and so on. If you do this you can be sure you won't overspend. However, if you are trying to estimate the size of the crowd at a football match you need to be accurate to the nearest thousand, rather than the nearest ten people.

We call the "rounded off" numbers "round figures", so in the examples given 70p and £6.00 are round figures. In the case of the football crowd 40,000 would be a round figure.

Rounding off with decimals

Rounding off is particularly useful when dealing with decimals.

For example: 3.9 becomes 4 correct to the nearest whole number. 2.68 becomes 2.7 correct to one decimal place. We could round off still further and make it 3 correct to the nearest whole number.

The rule is that if the figure at the far right end of the number is 5, 6, 7, 8 or 9 then the figure next to it on the left is rounded off.

If the figure on the far right end of the number is 0, 1, 2, 3 or 4, then the number next to it on the left stays as it is.

You can do this as many times as you need to, in order to be as accurate as necessary. Remember that the more times you "round off" in this way the less accurate your answer becomes. This is why it is important to know how accurate you need to be in each case.

Try rounding off these numbers correct to one decimal place:

6.88

5.16

8.92

9.134

10.026

112.55

Decimal Problems

1. How much do 6 litres of petrol cost at 50p per litre?
2. I want to check my electricity bill. The unit price is 2.968 pence and the standing charge is £2.10. I have used 295 units and have been charged £10.80. Is this correct?
3. Telephone bills are charged at 3p a unit. What is the charge for 364 units? The standing charge is £8.25. VAT at 15% is added at the end, what is the total bill?
4. Gas bills are calculated on 2 rates. The unit is called a therm. The first 52 therms are charged at 22.8 pence, and thereafter at 15.3 pence per therm. This quarter I used 132 therms. How much should I pay for the gas?
5. I want to change £20.00 into US dollars. If the exchange rate is \$2.2 to the pound sterling, how much should I get in dollars?
6. To convert from miles to kilometres, you multiply by 1.6093. How many kilometres are there in $12\frac{1}{2}$ miles?

Per Cent

Per cent means "in each hundred"

Per cent is written like this %.

100% means 100 in each 100.

100% means the whole of something

50% means 50 in each 100.

50% means half of something.

25% means 25 in each 100.

25% means a quarter of something.

75% means 75 in each 100.

75% means three quarters of something.

100% of £100 is _____

50% of £10 is _____

25% of £400 is _____

75% of £100 is _____

100% of 900 people is _____

50% of 400 people is _____

25% of 800 people is _____

Percentages and Fractions

"Per cent" means per hundred, or out of every hundred.

50% means 50 out of every hundred.

As a fraction this is written $\frac{50}{100}$ which is the same as $\frac{1}{2}$

In the same way

$$1\% = \frac{1}{100}$$

$$100\% = \frac{100}{100} = 1 \text{ (the whole)}$$

$$25\% = \frac{25}{100} = \frac{1}{4}$$

Percentages to fractions

Any percentage can be written as a fraction - write the number as a fraction over 100, and simplify if you can.

$$17\% = \frac{17}{100}$$

$$15\% = \frac{15}{100} = \frac{3}{20}$$

$$22\% = \frac{22}{100} = \frac{11}{50}$$

$$12\frac{1}{2}\% = \frac{12\frac{1}{2}}{100} = \frac{25}{100} = \frac{1}{8}$$

$$7\frac{1}{2}\% = \frac{7\frac{1}{2}}{100} = \frac{15}{100} = \frac{3}{40}$$

Try these:

$$13\% \quad 30\% \quad 5\% \quad 10\% \quad 2\frac{1}{2}\% \quad 33\% \quad 75\% \quad 68\% \quad 15\frac{1}{2}\%$$

$$6\frac{1}{4}\% \quad 9\% \quad 66\%$$

Fractions to percentages

Any fraction can be written as a percentage - multiply the fraction by 100 ($\frac{100}{1}$) and call it the percentage.

$$\frac{1}{2} \quad \frac{1}{2} \times \frac{100}{1} = \frac{100}{2} = 50$$

$$\text{so } \frac{1}{2} = 50\%$$

$$\frac{1}{100} \quad \frac{1}{100} \times \frac{100}{1} = \frac{100}{100} = 1$$

$$\text{so } \frac{1}{100} = 1\%$$

$$\frac{1}{4} \quad \frac{1}{4} \times \frac{100}{1} = \frac{100}{4} =$$

$$\text{so } \frac{1}{4} = 25\%$$

$$\frac{7}{8} \quad \frac{7}{8} \times \frac{100}{1} = \frac{700}{8} = 87\frac{4}{8} = 87\frac{1}{2}$$

$$\text{so } \frac{7}{8} = 87\frac{1}{2}\%$$

Try these:

$$\frac{3}{4} \quad \frac{1}{10} \quad \frac{1}{5} \quad \frac{23}{100} \quad \frac{3}{5} \quad \frac{1}{20} \quad \frac{5}{100} \quad \frac{1}{8} \quad \frac{5}{8} \quad \frac{91}{100}$$

$$\frac{17}{40} \quad \frac{2}{3} \quad \frac{1}{6} \quad \frac{5}{12} \quad \frac{3}{200}$$

Finding the Percentages – Fraction Method

What is 20% of 635?

How do I find 13% of £6.50?

How much is $7\frac{1}{2}\%$ interest on £1,250?

First change the percentage into a fraction, replace "of" by $\times$ and multiply.

1. 20% of 635 $\frac{20}{100} \times 635 = \frac{635}{5} = 127$ so 20% of 635 is 127

2. 13% of £6.50. First change £6.50 to 650p

$$\frac{13}{100} \times 650 = \frac{845}{10} = 84\frac{1}{2} \quad \text{so 13\% of £6.50 is } 84\frac{1}{2}\text{p}$$

3. $7\frac{1}{2}\%$ of £1,250. We can leave this sum of money in £

$$\frac{7\frac{1}{2}}{100} \times 1250 = \frac{15}{200} \times 1250 = \frac{3}{4} \times 125 = \frac{375}{4} = 93\frac{3}{4}$$

so $7\frac{1}{2}\%$ of £1250 is £93 $\frac{3}{4}$ which is £93.75.

Try these:

1. 5% of 900

2. 12% of £38.00

3. 6% interest on £1000

4. 32% of 525

5. $2\frac{1}{2}\%$ of £16.20

6. $7\frac{1}{2}\%$ discount on £2,320

What percentage is 15 out of 300?

First write the numbers as a fraction, then multiply by 100, and the answer is the percentage.

$$\frac{15}{300} \times \frac{100}{1} = \frac{1500}{300} = \frac{15}{3} = 5\%$$

What percentage is 5p out of £5?

Before we can work the percentage, both numbers must be in the **same units**, so here we change £'s to pence: £5 = 500p

$$\frac{5}{500} \times \frac{100}{1} = \frac{500}{500} = \frac{1}{1} = 1\%$$

Find these percentages:

1. 65 out of 650

2. 18 out of 30

3. 25 out of 750

4. 15p in the pound

112

5. £1.20 discount on £72.00

Finding the Percentages – Practice Method

To do percentage sums using this method you need to understand that 100% means the whole of something, and work from there.

If you want to find 50% of 600 people, you say:

100% of 600 people = 600 people

50% of people = 300 people

You've done a hidden division sum.

You've said that $100\% \div 2 = 50\%$

and done the same thing at the other end of the equation,

$600 \text{ people} \div 2 = 300 \text{ people}$

You divide by 2 in this case because you know that you have to divide 100 by 2 to get the answer 50.

Suppose you want to find: 25% of 600 people, you say,

100% of 600 people = 600 people

25% of 600 people = 150 people

You've divided by 4 this time because $100 \div 4 = 25$, so you divide 600 by 4 to get 150.

Now try these:

50% of £40

25% of 800

75% of 1000

10% of £500

75% of 200 people

50% of 1000 votes

25% of 80 countries

15% of 1000 cars

40% of 160 marks

10% of £50.40.

Percentage Increase and Decrease

Recently, busfares have increased from 16p to 20p. What percentage increase is this?

The rule is:

$$\% \text{ increase} = \frac{\text{actual increase}}{\text{original number}} \times \frac{100}{1}$$

In this case

$$\% \text{ increase} = \frac{4}{16} \times \frac{100}{1} = \frac{1}{4} \times \frac{100}{1} = \frac{100}{4} = 25\%$$

So there was a 25% increase in busfares.

When you are doing a sum like this, make sure that the actual increase and the original number are in the **same units**.

Percentage decrease is worked out in the same way.

A washing machine is reduced from £120 to £84 in a sale. What percentage decrease is this?

The rule is:

$$\% \text{ decrease} = \frac{\text{actual decrease}}{\text{original number}} \times \frac{100}{1}$$

In this case, the actual decrease is £120 - £84 = £36.

$$\% \text{ decrease} = \frac{36}{120} \times \frac{100}{1} = \frac{36}{6} \times \frac{5}{1} = \frac{6 \times 5}{1} = 30\%$$

The washing machine was reduced by 30%

It could have been marked 30% off.

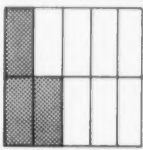
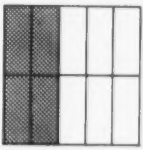
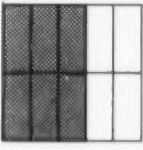
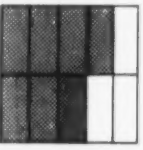
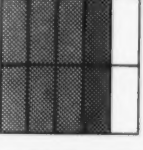
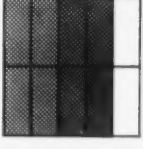
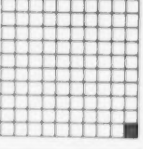
Percentage Problems

1. My coat cost £15 in a sale. The ticket said '50% off', so what was the original price?
2. George got a 10% pay rise last week. He used to be paid £60.00 a week basic, what does he get now?
3. Jill's rent went up 8% last June. She used to pay £15 a week for her flat, how much is it now?
4. If you read that the £ was now 60% of its 1971 value, what would that mean exactly?
5. You sometimes hear people say "I'm 99% sure of it". What do they mean?
6. What percentage of the whole population of this country is over 60 do you think? How would you find out the exact number?
7. How do you say 'double it' as a percentage?
8. You have to put a 10% deposit on a new washing machine as part of the Hire Purchase agreement. If the machine costs £180, how much is the deposit?
9. In an Opinion Poll, 5% of those questioned were "Don't knows". 1000 people were interviewed altogether. What's 5% of 1000?
10. My son got $\frac{40}{50}$ in his maths exam. His teacher said that was 70%. Was he right?

Problems on Percentage Increase and Decrease

1. A tape recorder is marked at £63, reduced from £75. What percentage decrease is this?
2. My pay rise came through this week. I received £95.50. Last week I got £90. What percentage pay rise have I had?
3. Because of an increase in VAT, a pair of shoes costing £12.80 before the increase now cost £13.99. What is the percentage increase in price? (approximately).
4. How much would a different pair of shoes cost now if they were originally £15.00?
5. In the sales, a coat is marked '15% off'. The original price was £48.50. What is the new price?
6. In a discount store a sign says '20% off all marked prices'. How much would I save on these things?
 - a) a set of pans marked £28.95.
 - b) an electric heater marked £29.20
 - c) a blanket marked £8.42.
7. I am due for a 9% pay increase. My last pay packet was £87.50. What will I get this week?
8. I saw the same radio for sale in 2 shops. One was marked down from £19.15 to £15.50. The other was marked '12% reduction' from £18.25.
 - a) which was the cheaper radio?
 - b) which was reduced the most?

Comparing Percentages, Fractions and Decimals

Percentage	Fraction	Decimal	
30%	$\frac{3}{10}$	0.3	
40%	$\frac{4}{10} = \frac{2}{5}$	0.4	
60%	$\frac{6}{10} = \frac{3}{5}$	0.6	
70%	$\frac{7}{10}$	0.7	
80%	$\frac{8}{10} = \frac{4}{5}$	0.8	
90%	$\frac{9}{10}$	0.9	
1%	$\frac{1}{100}$	0.01	



The Numeracy Pack

Diana Coben and Sandy Black

Book 4

ALBSU
Adult Literacy & Basic Skills Unit



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Feelings about Maths

'I was away from school from 10-11 and never caught up.'

'I avoid numbers as much as possible'.

'I've always detested maths.'

'They are anathema to me.'

'I was a disaster at school maths —always afraid.'

'I was good at primary school but I got left behind when I changed schools and never caught up.'

'I'm frightened of them'.

'I was always embarrassed when numbers came up in conversation, especially in pubs, and would leave the group if at all possible until the conversation changed.'

These comments were made by some of the people interviewed as part of recent research into the use of maths by adults in daily life.*

How do you feel about maths?

Do you agree with the comments on this page?

Do you know what it is about maths that makes you feel the way you do?

*Bridgid Sewell: *Use of Mathematics by Adults in Daily Life*, Advisory Council for Adult and Continuing Education (ACACE) Enquiry Officer's Report 1981.

Distributed by The National Institute of Adult and Continuing Education, 19B De Montford Street, Leicester LE1 7GE.

General Knowledge of Numbers

Fill in the gaps:

1. There are days in a week
2. There are days in a year.
3. Twice two are
4. is one more than six
5. Add one to three and you get
6. Take two away from six and you get
7. is the same as half a dozen
8. makes a pair
9. is one less than seven
10. is one more than nine
11. Three is half of
12. Eight is half of

Mixed Questions

1. $6 + 8 + 9 - 3$
2. How much do 6 pens cost at 24p each?
3. 24×4
4. $1\frac{1}{2}$ dozen is how many?
5. $174 - 96$
6. $\text{£}1 - 47\text{p}$
7. 18 times 8
8. $32 - 16$
9. $17 - 9$
10. 9×12
11. Add 3 threes to 4 nines
12. How many minutes in 24 hours?
13. 985 divided by 11
14. Share $\text{£}3.18$ between 6 people.
15. 328×39
16. 6 books at $\text{£}7.98$ cost?
17. If 7 tickets cost 63p, how much does 1 cost?
18. I spend $\text{£}3.27$ out of $\text{£}5$, how much is left?
19. How many fours in 32?
20. $\frac{1}{3}$ of 48

Roman Numerals

I II III IV V VI VII VIII IX X

These are the Roman numerals for the numbers 1 to 10.

The Romans based these numbers on the fingers and hands:

I
II were one two and three fingers
III

V was a whole hand (five fingers) with the fingers together and the thumb stretched out to make a V shape. IV meant one before five (4), and VI meant one after five (6). VII meant seven, and VIII meant eight in the same way.

X was both hands (ten fingers) with fingers and thumbs together and the hands straight, held together to make a cross. IX meant one before ten and XI meant one after ten and so on.

The Roman number system did not use Place Value as we do.

The larger numbers did not relate to fingers and hands, but to the names of the numbers in Latin.

L 50 C 100 D 500 M 1000

Nowadays, Roman Numerals are mainly used on clock faces, after the names of kings and queens and in film credits, to show the year the film was made.

They are generally thought to look formal and impressive and are therefore used whenever such an effect is intended.

What would these Roman numbers be, written as ordinary numbers?

XV	XX	DC
VIII	XIX	XXIII
XC	LX	MD

Trick Questions

1. One wild and windy night a traveller arrived at a lonely inn. He asked the landlord for a room, explaining that he had no money with which to pay, but he did have a magic gold chain with seven links.

The landlord was not at all sure about taking a guest with no money, even if he did have a magic gold chain but he was a kind-hearted man, and outside the wind howled and the rain lashed down, so he asked the traveller to show him the chain.

This the man willingly did, saying that the magic in the chain meant that it would only break in two places. He said he wanted to stay at the Inn for one week and promised to pay the landlord one link every day.

"How are you going to do that?" the landlord asked in astonishment, "If it will only break in two places?"

How did the traveller pay the landlord?

2. There's a pile of socks heaped together in a cupboard. There are 25 red socks and 25 green ones. If you were blindfolded, how many would you have to take out to be sure of getting a pair?
3. Twin boys stand at a fork in the road. One road leads to the Safety, the other road leads to Danger.

One twin always tells the truth, one twin always lies.

What one question can you ask to be sure of finding the way to safety?

Trick Questions: Answers

Whatever the reply, you should go the opposite way.

"If I were to ask your brother which was the way to Safety, what would he say?"

3. You need to say:

2. You need to take three socks.

The seventh night he gave him link 1.

The sixth night he gave him links 2 and 3 and got 1 back.

The fifth night he gave the landlord link 1 again.

The fourth night he gave the landlord links 4, 5, 6 and 7 and got 1, 2 and 3 back.

The third night he gave the landlord link 1 again.

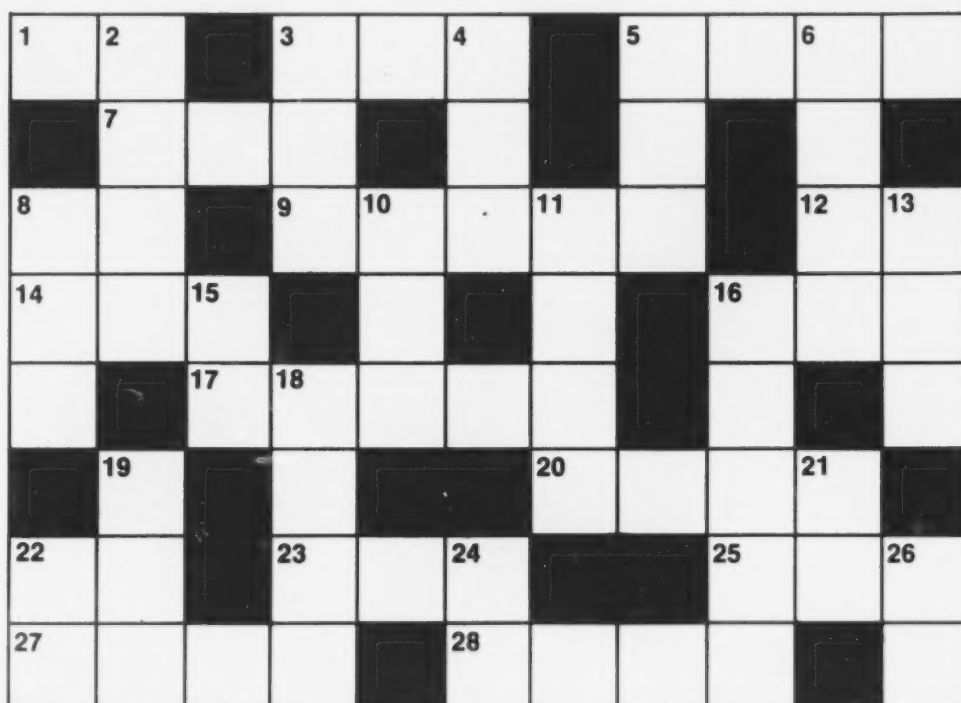
The second night he gave the landlord links 2 and 3 and got link 1 back.

The first night he gave the landlord link 1.



1. The traveller broke the chain like this:

Cross Your Numbers (1)



Put one number in each square

Across

1. 6×6
3. $116 + 408$
5. 202×30
7. 20×10
8. 8×8
9. $21073 + 5216 + 5278$
12. 7×7
14. 12×12
16. $412 - 156$
17. Thirty-one thousand, two hundred and fifteen
20. $2741 - 360$
22. Six times seven
23. $3159 \div 9$
25. $\frac{1}{2}$ of 648
27. 584×7
28. 361×24

Down

2. 892×7
3. $625 - 122$
4. 25×19
5. $712 - 85$
6. $3472 + 2773$
8. 123×5
10. $336 \div 3$
11. Six thousand and fifty-two
13. $6734 \div 7$
15. $\frac{1}{2}$ of 86
16. 2131×14
18. $941 + 97$
19. 36×20
21. a dozen
22. four elevens
24. $1\frac{1}{2}$ dozen
26. 4×10

Cross Your Numbers (2)

1		2		3	4
		5	6		
7					
		8		9	
10	11				
12					

Across

- Three hundred and fifty minus one
- $4\frac{2}{3}$ dozen
- $1436 + 2078$
- $9000 + 200 + 60 + 7$
- 82×90
- How many minutes in 3 hrs. 33 minutes?
- $849405 - 32875$

Down

- 524×647
- How many pence in £9367.36?
- 4 sixes plus 3 nines
- $2 \times 2 \times 2 \times 2 \times 2 \times 2$
- How many tenths in $57\frac{3}{10}$?
- $5761 \div 7$
- $297 \div 27$

Fill in one figure to each square.

Cross Your Numbers (1) Answers

¹ 3	² 6		³ 5	2	⁴ 4		⁵ 6	0	⁶ 6	0
	⁷ 2	0	0		7		2		2	
⁸ 6	4		⁹ 3	¹⁰ 1	5	¹¹ 6	7		¹² 4	¹³ 9
¹⁴ 1	4	¹⁵ 4		1		0		¹⁶ 2	5	6
5		¹⁷ 3	¹⁸ 1	2	1	5		9		2
	¹⁹ 7		0			²⁰ 2	3	8	²¹ 1	
²² 4	2		²³ 3	5	²⁴ 1			²⁵ 3	2	²⁶ 4
²⁷ 4	0	8	8		²⁸ 8	6	4	4		0

Cross Your Numbers (2) Answers

¹ 3	4	² 9		³ 5	⁴ 6
3		⁵ 3	⁶ 5	1	4
⁷ 9	2	6	7		
0		⁸ 7	3	⁹ 8	0
¹⁰ 2	¹¹ 1	3		2	
¹² 8	1	6	5	3	0

What's the Time?



It's one o'clock
1.00



It's two o'clock
2.00



It's three o'clock
3.00

What's the Time?



It's half past two
2.30

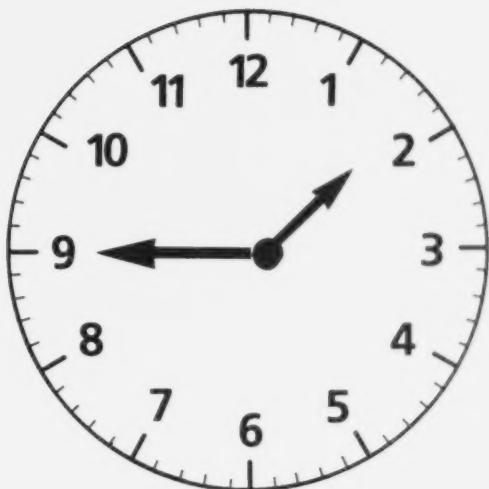


It's half past seven
7.30



It's half past ten
10.30

What's the Time?



It's a quarter to two
1.45



It's a quarter past twelve
12.15



It's a quarter to six
5.45

What's the Time?



It's five past three
3.05



It's twenty past ten
10.20



It's ten past five
5.10

What's the Time?



It's ten to two
1.50

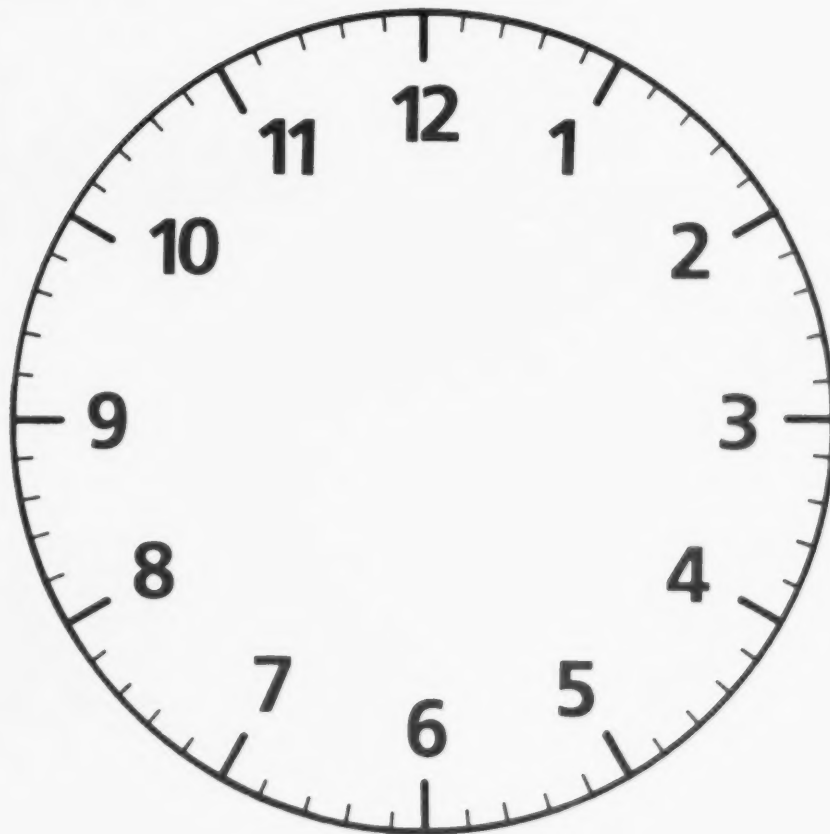


It's twenty-five past nine
9.25



It's five to four
3.55

Telling the Time



What do you say when the minute hand is on 1?

What do you say when it's on 2?

What do you say when it's on 3?

What do you say when it's on 4?

What do you say when it's on 5?

What do you say when it's on 6?

What do you say when it's on 7?

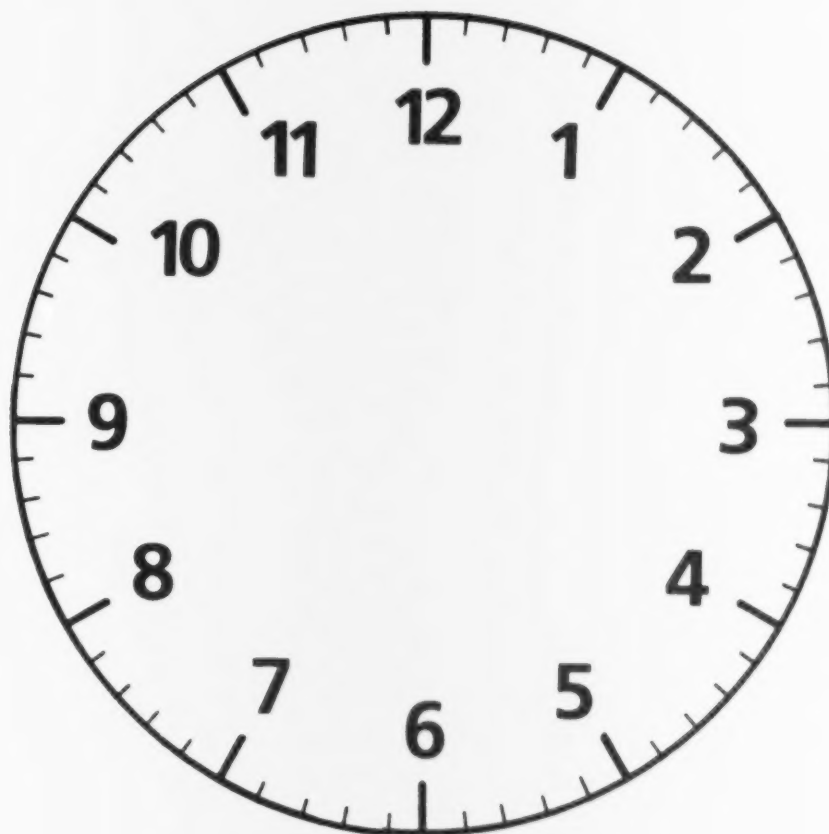
What do you say when it's on 8?

What do you say when it's on 9?

What do you say when it's on 10?

What do you say when it's on 11?

Counting the Minutes (1)



How many minutes from 3 to 6?

How many minutes from 8 to 11?

How many minutes from 12 to 6?

How many minutes from 4 to 8?

How many minutes from 5 to 8?

How many minutes from 1 to 7?

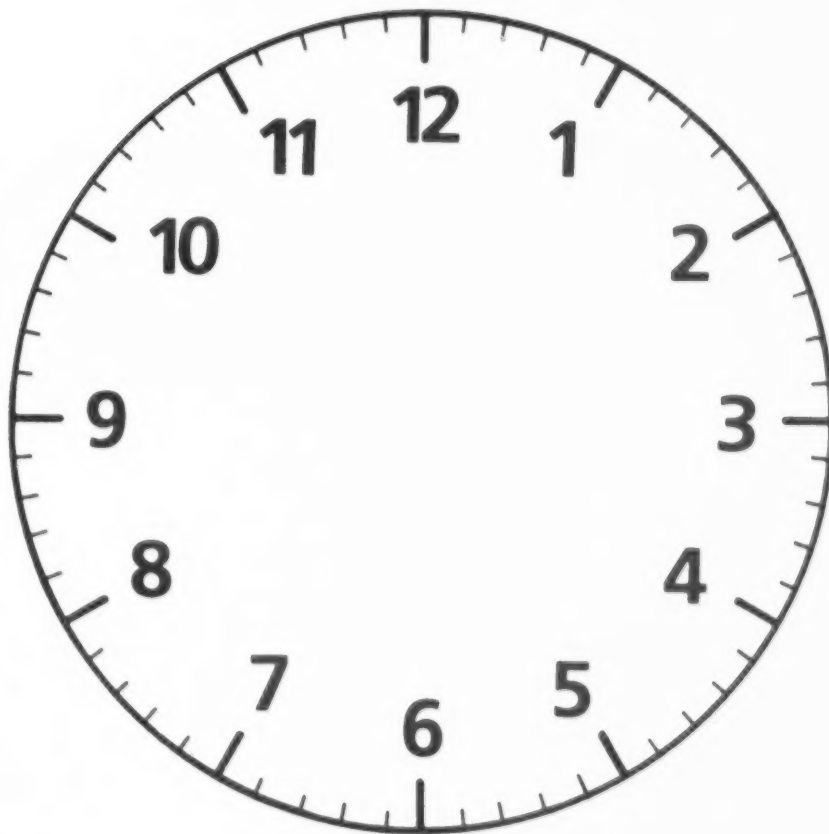
How many minutes from 5 to 9?

How many minutes from 7 to 10?

How many minutes from 2 to 6?

How many minutes from 8 to 12?

Counting the Minutes (2)



How many minutes between five past and ten past?

How many minutes between twenty past and half past?

How many minutes between twenty-five past and twenty to?

How many minutes between five past and twenty past?

How many minutes between quarter past and quarter to?

How many minutes between twenty to and five past?

How many minutes between quarter to and five to?

How many minutes between ten to and five to?

How many minutes between quarter past and twenty-five to?

a.m. and p.m.

The clock tells us what the time is but it doesn't tell us whether it's morning, afternoon, evening or the middle of the night.

Usually you can tell by common-sense, if you ask somebody round to tea at four o'clock you don't expect them to wake you up at four in the morning.

For occasions when it's not so obvious what time of day is meant, we have the letters a.m. and p.m. 4 p.m. can only mean 4 o'clock in the afternoon.

a.m. means morning. The letters stand for ante-meridian, Latin for before midday.

p.m. means afternoon and evening. The letters stand for post meridian or after midday.

10 a.m. means 10 o'clock in the morning, 5 p.m. means 5 o'clock in the afternoon.

Now put these times under the right headings:

6 p.m.
3 a.m. 2.55 p.m.
8 p.m. 6.15 a.m.
12 midday 9.40 p.m.
4.30 p.m. 3.12 a.m.

Morning	Afternoon	Evening

The Clock

Write these times in figures:

1. six o'clock
2. ten minutes past four
3. twenty-five minutes past seven
4. half past eight
5. a quarter past eight
6. half past five in the afternoon
7. quarter past eleven in the morning
8. twenty-five past ten in the evening
9. five past two in the morning
10. nine o'clock in the evening
11. twenty to five
12. quarter to eight in the evening
13. twenty-five minutes to six
14. fifteen minutes to four in the afternoon
15. five minutes to three
16. thirteen minutes to four
17. twenty-six minutes past nine
18. forty-five minutes past five
19. seventeen minutes past one
20. fifty-five minutes past eleven

Time Sense

1. How long do you allow to get home from the shops?
2. How long does it take you to get to classes?
3. If I go to the Launderette with a load of washing, put it in the machine and go off and do some shopping, how long should I allow before I go and pick it up?
4. My next door neighbour is an old lady. She says she was born in the reign of Queen Victoria, who died in 1901. That means she must be at least how old?
5. You have an hour for lunch - is that long enough to go to the Library, pick up your shoes from the mender's, take the dog out for a run and have your lunch?
6. Kathy leaves her little boy at the Play-Group at 9 o'clock every morning and picks him up at 3 p.m. She wants to get a part-time job locally, taking travelling time into account, what do you think are the hours she could realistically expect to do?
7. How long do you allow in the mornings to get ready to go out?
8. If you can do a journey by car that takes a quarter of an hour in the middle of the day, how long would you allow for the same journey in the rush hour?
9. How long ago was the Blitz?
10. What was the date 100 years ago today?
11. When will a baby born today be 50 years old?
12. Why is this called the 20th century, although we say 1979, 1980 and so on?

The 24 Hour Clock

2	2	1	4
---	---	---	---

The 24 hour clock enables us to tell the time without having to say a.m. or p.m., in the morning, in the afternoon or so on. It's used in time-tables for this reason.

The times up to midday are written in the usual way except that we put an 0 in front of the 0 to 9 so that, for example, 8 o'clock becomes 08.00 written in the '24 hour' way.

After 12 o'clock midday we count on 12.00, 13.00, 14.00, 15.00 and so on. Five past one in the afternoon would be written 13.05.

How would these times be written?

8.20 p.m.

4.15 p.m.

9.40 p.m.

3.30 a.m.

6.30 p.m.

7.00 a.m.

10.10 a.m.

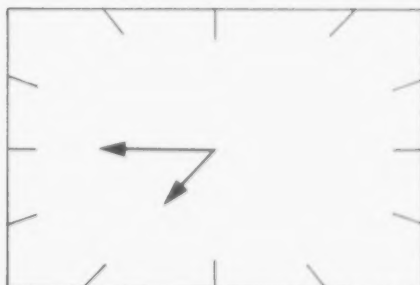
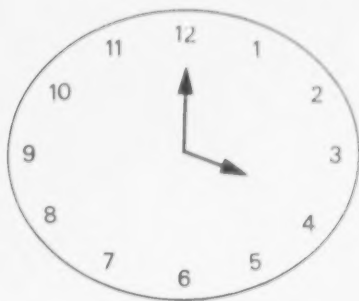
5.45 a.m.

2.25 p.m.

Note: We say fourteen hundred hours for 14.00, and sixteen 0 five, sixteen ten for 16.05, 16.10 and so on.

The Digital Watch

Match up the times on these watches:



What would these times look like on a digital watch or clock?

3 pm

20 past 6

half past seven

10 to eight

quarter to nine

quarter past eleven

25 to ten

17 minutes past 4

13 minutes to 5

21 minutes to 1

Which way of showing the time do you prefer and why?

Time expressed as a Decimal

There are 60 minutes in 1 hour.

This means when you calculate time you must remember that any number of minutes above 59 takes you up to the next hour. This is obvious when you think about it but it's easy to forget when you are working in columns like this:

$$\begin{array}{r}
 \text{h} \quad \cdot \quad \text{m} \\
 1 \quad \cdot \quad 59 \\
 \quad \cdot \quad 01 \quad + \\
 \hline
 2 \quad \cdot \quad 00
 \end{array}$$

The • between the minutes and the hours is **not** a decimal point, it's just a way of showing where the minutes end and the hours begin.

It is possible to express time in decimal terms, however. To do this you need to use your knowledge of Place Value and remember that the first decimal place (that is, the first figure to the **right** of the decimal point) tells you the number of tenths ($\frac{1}{10}$).

If you divide an hour into 10 equal parts you will have divided it into tenths. You can set this out in various ways:

$$6 \div 10 = 6 \text{ minutes}$$

$$\begin{array}{r}
 6 \text{ minutes} \\
 10 \overline{)60}
 \end{array}$$

$$\frac{60}{10} = 6 \text{ minutes}$$

Whichever way you set it out you should find that one tenth of an hour equals 6 minutes.

In other words, 0.1 of an hour is 6 minutes.

This means that 0.2 of an hour is 2×6 minutes, which is 12 minutes.

0.3 of an hour is 3×6 minutes – and so on.

Try these: what are these times in hours and minutes?

3.6h

5.1h

68.4h

4.8h

5.2h

6.9h

3.3h

7.8h

Time can be expressed in decimals using more than the first decimal place only, for example:

2.25h

6.75h

What do those times mean in hours and minutes?

Reading a Timetable

Norwich		Liverpool Street		Liverpool Street		Norwich	
X06.25		08.38		e04.00		08.18	
S06.46	a	08.59		04.30		08.31	
X06.56	X a	09.00		p07.00		n09.52	
07.20	a d	09.34		08.30	X a	g10.38	
07.58	X a a	09.49		09.30	X a a	11.25	
08.32	X a a	g10.43		10.30	X a a	g12.38	
B09.29		11.34		11.30	X a a	13.25	
09.42	X a a	11.39		A12.00		14.18	
10.32	X a a	g12.43		12.30	X a a	g14.38	
11.42	X a	13.39		13.30	X a a	15.25	
12.32	X a a	g14.43		14.30	X a a	g16.38	
13.42	X a a	15.39		15.30	X a a	17.25	
14.29	X a a	h16.45		16.30	X a a	g18.40	
S15.42	a	17.39		17.30	X a a	19.25	
X15.48	X a	17.48		X18.12	X a	20.20	
16.29	X a a	h18.45		S18.30	a	20.44	
17.42	X a a	19.39		X18.40	a	20.52	
18.44		21.01		19.30	X a a	21.25	
19.52		k22.26		20.30		n22.41	
e23.15		m02.22		X23.00		01.34	
X23.45		03.55		Xe23.14		02.14	
				Se23.30		02.27	
				Xc23.55		02.48	

Notes

A Saturdays only 30 June to 8 September
 B Saturdays only 30 June to 15 September
 S Saturdays only
 X Saturdays excepted
 a On Saturdays a only
 c Change at Ipswich
 d No a on Saturdays

e Via Cambridge
 g 4 mins. later on Saturdays
 h 2 mins later on Saturdays
 k 4 mins earlier on Sats.
 m Arrives 02.26 Sunday mornings
 n 1 min. later on Saturdays
 p 07.05 on Saturdays

For other notes and Sunday trains, see over →

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Use the timetable to answer these questions:

- When does the 07.20 from Norwich arrive in London?
- When does the 09.30 from London arrive in Norwich?
- I want to get to Norwich at about quarter past eight in the evening, to catch a connecting train. What train should I catch from Liverpool Street to be there on time?
- What time is the latest train you could take from Liverpool Street to get to Norwich before midday?
- Your friend writes and asks you to meet her off the train from Norwich. Her train leaves Norwich at eighteen minutes to six, what time does it get in to Liverpool Street?

On this timetable you read across: the first train from Norwich to London in the morning leaves Norwich at 06.25 and arrives at Liverpool Street at 08.38

Remember that timetables use the 24 hour clock so 06.25 can only be 6.25 a.m. since 6.25 p.m. would be written as 18.25.

The timetable also gives extra information such as whether refreshments are available on the train. Use it to answer these questions:

- Does the 12.32 from Norwich to Liverpool Street go through Cambridge?
- Would I have to change trains if I caught the 23.55 from Liverpool Street to Norwich?
- Can I get a cup of tea or coffee on the 07.58 Norwich to London train?
- My aunt said she'd meet me off the 1812 train from Liverpool Street on Saturday. I think she's misread the timetable, am I right?
- Is there a restaurant on the 11.30 train from Liverpool Street?
- What do we mean by the 23.30 London to Norwich train?
- What time does the 08.30 from Liverpool Street get in at Norwich on Saturdays?

Working with Time

When I arrive at the station, the clock says 14.26. The train I want leaves at 15.03. How long have I got to wait?

To find out, take away the time now from the time the train leaves. By common sense, remembering there are 60 minutes in 1 hour, there are 60 - 26 minutes left before 15.00 hrs. that is 34 minutes. My train is at 15.03 which means 3 more minutes to wait after 15.00 - so altogether I have to wait $34 + 3 = 37$ minutes.

It is much easier to do time calculations in your head, rather than writing them down, especially if you can imagine a clock face with the hands going round. We can write a sum, but we have to take great care, because we are counting the minutes in lots of 60.

$$\begin{array}{r} \text{hr} \quad . \quad \text{min} \\ 15 \quad . \quad 03 \\ - 14 \quad . \quad 26 \\ \hline \end{array}$$

First we say 6 from 3 won't go, borrow 10. In fact we have to borrow from the 5 in the hours column, leaving 4. When 1 hour moves across, it becomes 60 minutes, which we split into 50 and 10. Now we carry on as normal.

$$\begin{array}{r} 14 \quad . \quad 503 \\ - 14 \quad . \quad 26 \\ \hline 00 \quad . \quad 37 \end{array}$$

Adding time: The ticket collector says the journey takes 85 minutes. At what time should the train get in?

First write 85 minutes = 1 hr 25 min because 60 min = 1 hr.

Now add this time to the time the train set off

$$\begin{array}{r} \text{hr} \quad . \quad \text{min} \\ 15 \quad . \quad 03 \\ + 1 \quad . \quad 25 \\ \hline 16 \quad . \quad 28 \end{array}$$

the train gets in at 16.28

1. At the pictures, the main film starts at 7.35 p.m. It lasts 112 minutes. What time will it finish?
2. A train journey lasts for 3 hrs 42 min. We set off at 12.36 by the station clock. What time should we arrive?
3. The coach from Victoria to Bristol leaves at 14.55. According to the timetable, it should arrive at 17.36. How long is the journey?
4. I went to the doctor's today - he said come back in 6 weeks' time for a check up. What will the date of my next appointment be?
5. A radio announcer said there are only 152 days to Christmas. How many weeks is this?

How Long Does It Take?

1. The news starts at 10.05 and ends at 10.15. How long is it on for?
2. London to Birmingham is 90 miles. My average speed for the journey is 45 m.p.h. If I leave home at 1.30 at what time do I arrive in Birmingham?
3. My train leaves Waterloo at 8.24 a.m. The journey takes 20 minutes. At what time do I arrive in Richmond?
4. Tom works in a shop from 6.00 p.m. to 7.45 p.m. each evening and from 9.00 am to 1.00 p.m. on Saturday. He gets 50p per hour.
How many hours does he work during the week in the evenings?
How many hours does he work on Saturdays?
How many hours does he work altogether?
How much money does he get altogether for a week's work?
5. Jim is a garage attendant every evening from 8.00 p.m. to 1.15 a.m. He works from 5.00 p.m. to 2.00 a.m. on Saturday.
How many hours does he work in the evenings during the week?
How many hours does he work on a Saturday night?
He is paid £1.00 per hour. How much does he earn in a week?
6. My train leaves at 22.56 and arrives at its destination at 23.40. How long does the journey take?
7. A film lasts from 8.35 to 10.05. How long is it on for?
8. A radio programme lasts for $1\frac{1}{2}$ hours. It starts at 10.20 a.m. When does it finish?
9. My uncle was 63 in 1975. When was he born?
10. My niece was born in 1966. How old is she now?
11. George was born in 1922. When can he retire?
12. The voyage from England to Norway by sea takes 22 hours. If the boat leaves at 15.30 on Tuesday, when does it arrive in Norway?

The Calendar

The calendar helps you find your way around the year just as a map helps you find your way around an area.

To use a calendar you need to know the months of the year and the days of the week. It helps to know the seasons too.

The months of the year are:

January	the seasons are	Winter
February		
March		Spring
April		
May		
June		Summer
July		
August		
September		
October		Autumn
November		
December		Winter

The days of the week are: Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday.

Now answer these questions:

1. How many months are there in a year?
2. How many days are there in a week?
3. What are the names of the seasons?
4. What is the month after May?
5. What is the month after December?
6. What is the date today?
7. What season are we in?
8. Why do people say "March comes in like a lion and goes out like a lamb?"
9. What month is Christmas in?
10. What is the hottest time of the year here? Is that the hottest time in Australia?

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Writing the Date

The quick way

- ☐ put the number of the day,
- ☐ the number of the month and then
- ☐ the last two numbers of the year.

Written this way the 23rd October 1980 becomes 23.10.80, the 23rd day of the 10th month of the 80th year of this century.

Write these dates the quick way:

January 3rd 1979

4th June 1984

September 10th 1962

May 21st 1942

Here are some dates to write in full:

3.8.66 _____

16.10.55 _____

30.9.77 _____

9.11.89 _____

22.2.70 _____

1.5.81 _____

Remember you can write either 2nd June 1982 or June 2nd 1982 but it is important to put the number of the day first when you are writing the date the quick way. For example 2nd June 1982 would be 2.6.82, but 6.2.82 would be the 6th February 1982. Just to make life difficult, in the United States of America they **do** put the number of the month first!

Days of the Month - The Calendar

Write down this rhyme: *Thirty days has September,
April, June and November.
All the rest have thirty-one,
Except for February alone,
Which has twenty-eight days clear,
And twenty-nine in each Leap Year.*

Now answer these questions by filling in the gaps:

1. How many days are there in October?

There are days in October.

2. How many days are there in June?

There are days in June.

3. How many days are there in September?

There are days in September.

4. How many days are there in February?

There are usually days in February

5. How many days are there in July?

There are days in July.

The Calendar - Abbreviations

The Months:

Jan. is short for January

Feb. is short for

Mar. is short for

Apr. is short for

May is always written in full as

June is always written in full as

July is always written in full as

Aug. is short for

Sept. is short for

Oct. is short for

Nov. is short for

Dec. is short for

The Days:

Mon. is short for

Tues. is short for

Weds. is short for

Thurs. is short for

Fri. is short for

Sat. is short for

Sun. is short for

Dates and Ages: Personal

1. Q. When were you born?

A. I was born in

4. Q. How old were you in 1970?

A. In 1970 I was years old.

2. Q. What is your date of birth?

A. My date of birth is

5. Q. How old will you be in 1990?

A. I will be years old in 1990.

3. Q. How old are you now?

A. I am years old

Using the Calendar

1. My friend's birthday is in three weeks time, on a Thursday. What date is that?

2. I've booked my holiday for two weeks in July. How many months away is it?

3. Gina's little girl is exactly one month older than my son. His birthday is on the 5th of this month so when is it Gina's daughter's birthday?

4. When is Midsummer's Day?

5. Mrs Green has a dental appointment at 10.30 on Monday morning. What date will that be?

6. I made some wine which is supposed to be kept for six months before you drink it. I made it in June, is it ready yet?

7. My Driving Test is on the 12th October. How long have I got to get ready for it?

8. Amina comes to evening class twice a week on Tuesdays and Thursdays. In a month's time she goes on holiday, what is the date of her last Thursday class before she goes?

9. When do we put the clocks forward and backwards? Why do we do it?

10. There are two days in the year when the day and night are the same length. When are they?

11. Bill was born on the 29th February 1960. How old is he now? How many times has he been able to celebrate his birthday on the right day?

12. Why do you think we have a Leap Year every four years?

Ages

Fred's sister Julie is 24, she is 5 years older than him; how old is Fred?

Fred has four brothers and one sister. Their ages are 21, 14, 17, 26 and 24. What is the average age of everyone in Fred's family (including Fred)?

How old will Julie be in seven years time?

How old was Fred three years ago?

What year was the youngest born?

What will Julie's age be when Fred is 24?

What is the difference in years between the youngest and the eldest in Fred's family?

What year was Fred born?

Dates and Ages

What year is this?

Find the ages of people born in these years.

When were you born?

1. 1943 9. 1969

How old are you?

2. 1940 10. 1972

To find the age of a person when you know the year they were born:

3. 1956 11. 1903

1984
 1942 — this year
 — year born
 — take away to
 — find the age of the person.

4. 1922 12. 1890

5. 1937 13. 1918

6. 1900 14. 1960

7. 1928 15. 1951

8. 1914

When were people of these ages born?

To find the year of birth when you know the age of the person.

1. 9 yrs. 7. 25 yrs.

1984 — this year
 36 — age of person
 — take away to
 — find the year of birth

2. 21 yrs. 8. 50 yrs.

3. 54 yrs. 9. 100 yrs.

4. 30 yrs. 10. 65 yrs.

5. 2 yrs. 11. 42 yrs.

6. 17 yrs. 12. 78 yrs.

Pounds and Pence

We use 2 units of money, pounds (£) and pence (p)

There are 100 pence in one pound

so, 200p = £2 500p = £5 1000p = £10 and so on.

Whole pounds are written like this:

£1 £2 £10 £18 £52 £150 and so on.

Pounds and pence are written in decimal form with whole pounds, decimal point, then 2 figures to show pence from 1p to 99p.

£1.25 one pound twenty-five pence

£2.86 two pounds eighty-six pence

£1.05 one pound five pence

£1.50 one pound fifty pence

£3.09 three pounds nine pence

Note that for 1p to 9p over the pound we write 01, 02, ...08, 09 after the point to avoid confusion with 10p, 20p 80p, 90p.

Any odd half pence is added on the end: £2.42½, £8.50½

Whole pounds can also be written with zero pence: £1.00 £2.00 £10.00

How many pence?

£1 = 100p so £2 = 200p £3 = 300p and so on

How many pence in £1.67?

100p in £1 + 67p extra. 100p + 67p = 167p

How many pence in £3.42?

In £3 there are $3 \times 100p = 300p$, plus 42p extra. $300p + 42p = 342p$

How many pence in £11.06?

In £11 there are $11 \times 100p = 1100p$, plus an extra 6p. $1100p + 6p = 1106p$

So

£1.67 = 167p

£3.42 = 342p

£11.06 = 1106p

The rule is, ignore the point, write the same number and call them p.

Change these sums of money to pence:

£1.50 £6.72 £8.30 £2.99 £10.18 £10.07 £15.01 £34.20 £67.72

Pounds and Pence

How many pounds?

How many pounds is 250p?

There are 100 pence in £1, so 200p is £2. That leaves 50 pence.

So 250p = £2.50

How many pounds is 536p?

Count the hundreds: 500p is £5. That leaves 36p

so 536p = £5.36

The rule is: count 2 numbers from the right, put in the decimal point and call it pounds.

So 1234p = £12.34 199p = £1.99 and so on.

Less than 100p

45p is less than £1. To write 45p as pounds we have to put 0 in front of the point because there are no whole pounds:

45p = £0.45

Any amount between 1p and 99p can be written this way.

Change these sums of money to pounds: 708p

55p 1046p

88p 1875p

101p 2566p

172p 12½p

225p 67½p

430p 349½p

Giving Change and Getting Change

Do you know how the shop assistant works out what change to give you?

Can you check your change to see if it's right?

If you have ever looked at the coins in your hand and thought, "I'm sure I should have more than that." read on. . .

Suppose you're in a shop and you spend 42p and pay with a 50p piece. The assistant gives you 8p change. He or she will probably count the coins into your hand like this:

"42, 43, 45, 50"

Can you work out what coins you would have been given?

The point is that the assistant used the coins to count on, one for a penny, two for a two-pence piece, five for a five-pence piece and so on.

Try these questions, using the counting on method and real money if possible:

1. What change would you get from £1 if you spent 81p?
2. What change would you get from £5 if you spent £3.48?
3. I spent 33p in the Newsagent's, paid with a 50p piece and got 27p change. Was that right?
4. My bill came to £4.03 in the Supermarket. I gave the assistant a five pound note and three pence. What change should I have got?
5. At the Butcher's my bill came to £4.67. They were short of silver in the shop so the assistant asked me:
"Have you got the 17p?"
I gave it to him - with a five pound note, and he gave me my change. What was it?
6. Take a handful of coins from your pocket or your purse and see if you can guess how much money there is. Check your answer and see how close your guess was.

Going Shopping

D.S. SUPERMARKET

17 MAY 1984

00.38
00.31
00.23
00.15

01.07 CASH

What does the bill come to?

I gave the cashier two £1 notes,
how much change did I get?

Write the date at the top of the list
of prices in figures.

Going Shopping

C.B. SUPERMARKET

001.29
000.27½
000.46½
000.29½
000.38
000.38
000.17
001.75
002.08

007.08½ TOTAL
008.00 CASH
000.91½ CHANGE

What does the bill come to?

How much did I give the cashier?

How much change did I get?

Did I get the right amount of change?

Shopping - Find the Cost

1 lb. of apples cost 38p, so:

2 lb. of apples cost

3 lb. of apples cost

$\frac{1}{2}$ lb. apples cost

$1\frac{1}{2}$ lb. apples cost

1 packet of butter costs 45p, so:

2 packets of butter cost

4 packets of butter cost

If 1 packet of butter weighs 250g,
how much do:

2 packets weigh

4 packets weigh

$\frac{1}{4}$ lb. of ham costs 56p, so:

$\frac{1}{2}$ lb. of ham costs

2 oz. of ham costs

1 lb ham costs

100 g. of bacon costs 52p, so:

200 g. of bacon costs

400 g. of bacon costs

300 g. of bacon costs

How Much Does It Cost ?

1. 3 lbs. of apples at 25p per lb.
2. 7 metres of cotton at 80p per metre.
3. 5 feet of rope at 45p per foot.
4. 6 yards of woollen cloth at £5 per yard.
5. 4 lbs. of onions at 20p per pound.
6. 6 packets of envelopes at 50p per packet.
7. 8 pints of milk at 22p per pint.
8. 7 tins of dog food at 36p per tin.
9. 4 tubes of toothpaste at 54p per tube.
10. 8 cups of tea at 19p per cup.
11. 5 pints of beer at 66p per pint.
12. 6 reels of cotton at 30p per reel.
13. 3 paperback books at £1.50 per book.
14. 7 newspapers at 22p per newspaper.
15. 3 dozen eggs at 80p per dozen.
16. 6 biros at 48p per biro.
17. 9 balls of wool at 95p per ball.
18. 8 bars of chocolate at 29p per bar.
19. 2 pairs of tights at 54p per pair.
20. 4 litres of petrol at 50p per litre.

How Much Change Do You Get ?

1. At the Greengrocer's your bill comes to 89p. You pay with a £1 note.
2. At the Butcher's your bill comes to £3.62. You pay with a £5 note.
3. At the Baker's your bill comes to 54p. You pay with a £1 note.
4. At the Supermarket your bill comes to £7.92. You pay with two £5 notes.
5. At the Ironmonger's your bill comes to £2.88. You pay with three £1 notes.
6. At the Chemist's your bill comes to 63p. You pay with a £1 note.
7. At the Dress Shop your bill comes to £15.71. You pay with four £5 notes.
8. At the vegetable stall your bill comes to 76½p. You pay with a £1 note.
9. At the Wool Shop your bill comes to £4.98. You pay with a £5 note.
10. At the Delicatessen your bill comes to £1.23. You pay with two £1 notes.
11. At the Stationer's your bill comes to 45p. You pay with a 50 pence piece.
12. At the Department Store your bill comes to £2.65. You pay with a £5 note.
13. At the Fish and Chip shop your bill comes to £1.54. You pay with four 50 pence pieces.
14. At the Railway Station your ticket costs £2.26. You pay with three £1 notes.
15. At the Restaurant your bill comes to £6.77. You pay with one £5 note, a £1 note and two 50 pence pieces.
16. Your taxi fare is £1.90. You pay with a £1 note, a 50 pence piece and four 10 pence pieces.

How Much Does It Cost ? (2)

1. A driving school charges £8.10 per lesson. How much will 15 lessons cost?
2. 1 litre of petrol costs 55p. How much will 6 litres cost?
3. A meal at a restaurant costs £5.00 each. How much will it cost if Mr and Mrs Smith, Mrs Smith's brother and his wife all go for a meal together?
4. A seat at the cinema costs £2.85. If 7 people go together how much will they pay?
5. 1 kitchen chair costs £26.40. I need four chairs. How much will I have to pay?
6. A man bought 2 lbs. of onions at 25p per lb., 2 lbs. of carrots at 27p per lb., and $\frac{1}{2}$ lb. of mushrooms at 25p per $\frac{1}{4}$ lb. How much did he pay altogether?
7. A daily newspaper costs 22p, and it's not published on Sunday. How much did I pay the newsagent for a fortnight's papers?
8. A film costs £4.60 to develop. How much will 7 films cost?
9. My rent is £25.00 per week. How much per year?
10. $\frac{1}{2}$ lb. of butter costs 48p. How much will 5 lbs cost?
11. 50 gms of wool costs 35p. How much will 350 gms cost?
12. Whitechapel to Oxford Circus costs 50p on the tube. How much will it cost to travel to Oxford Circus and back once a day for seven days?
13. A man is paid £2.60 per hour. He works 40 hours per week. What is his weekly wage?
14. My television rental is £7.40 per month. How much do I pay in a year?
15. London to Birmingham is 90 miles. My car does 30 mpg. How many gallons must I buy for a trip there and back?

Buying Material

1. 6 yards of material at £1.65 per yard costs
2. 9 yards of material at £1.78 per yard costs
3. 14 yards of material at 94p per yard costs
4. 12 yards of material at 77p per yard costs
5. 10 yards of material at £2.57 per yard costs
6. 4 yards of material at £3.48 per yard costs
7. 50 yards of material at 89p per yard costs
8. 17 yards of material at 76p per yard costs
9. 37 yards of material at £5.44 per yard costs
10. 60 yards of material at 58p per yard costs
11. 49 metres of woollen cloth at £3.82 per metre costs
12. 58 yards of crimplene at £1.90 per yard costs
13. 15 metres of silk at £9.20 per metre costs
14. 8 yards of terylene at £2.90 per metre costs
15. 11 yards of lining material at £1.05 per metre costs
16. 48 metres of worsted at £6.88 per metre costs
17. 15 metres of lace at £3.20 per metre costs
18. $5\frac{1}{2}$ yards of nylon material at 82p per yard costs
19. $6\frac{1}{2}$ metres of Shantung at £9.24 per metre costs
20. $8\frac{1}{2}$ metres of denim at £2.30 per metre costs

Shopping Sense

1. I've got £15 in my pocket and I want to stock up at the supermarket. Can I afford to get rice, flour, sugar, tea and coffee? How much would you expect to pay for each item? What quantity of each item would you be able to get?
2. What are the things you have to pay for every week? Don't forget household bills such as rent as well as food. How much do you reckon you need to keep going?
3. What are the things you pay for every three months (quarterly)?
4. We hear a lot about inflation in the news, what is it?
5. A 250 gram jar of instant coffee is marked at £2.95. Would I be better off buying two 125 gram jars at £1.60 each?
6. I want a colour television and the one I like costs £250 if I pay cash, or £30 down and 12 monthly payments of £20 if I buy it on Hire Purchase. How much would I save if I could afford to pay cash? Which way would you choose to buy it? Why?
7. What is meant by the term "the cost of living"?
8. What do the letters V.A.T. stand for? What is V.A.T.?
9. What is the "Price Index"?
10. Which ever way you look at it, shopping's an expensive business. How do **you** save money?

Motoring

1. I drive from London to Leeds.

In London, my mile counter reads 65403

In Leeds, it reads 65601

How far is it from London to Leeds?

2. Before I start, I fill up with petrol.

I buy 6 litres at 50p.

How much altogether?

I also buy 1 pint of oil at 67p, and 2 bars of chocolate at 23p.

What is my total bill?

3. Half way there, I stop for a rest.

How many miles have I travelled?

What does the mile counter read?

4. I arrive at 6.15 p.m.

I had set off at half past 2.

How long was the journey?

Make a rough guess at my average speed.

Spending

1. Dave has £10 to spend.

He buys an L.P. for £4.50, and a magazine for 60p.

How much has he left?

2. A roll of cloth is 25 yards.

I cut off a length of $2\frac{1}{2}$ yards.

How much is left?

I cut off 3 more of the same length.

How much have I cut off altogether?

How much is left?

I now need 2 lengths of 3 yards, and one length of $6\frac{1}{2}$ yards.

How much is this?

How much is left on the roll now?

How many strips 1 foot wide can be cut from the rest?

3. A train journey lasts 4 hrs 20 min.

We leave the station at 12.15, what time should we arrive?

In fact, there is a delay of 25 mins.

When do we actually arrive?

The Metric System

We use the metric system to measure length, weight and capacity (volume). It is based on the number 10, in the same way as the decimal system. Unlike Imperial (English) units, one system covers length, weight and capacity. Calculating is easier in the metric system, once you know how it works.

The metric unit of length is the **metre** (m)

The metric unit of weight is the **gram** (g)

The metric unit of capacity is the **litre** (ℓ)

Each unit has a two-part name which consists of one of the following:

kilo, hecta, deca, deci, centi or milli followed by a metre, gram or litre.

Kilo is the biggest, milli is the smallest. This is how they fit together:

kilometre km	hectometre hm	decametre dam	metre m	decimetre dm	centimetre cm	millimetre mm
kilogram kg	hectagram hg	decagram dag	gram g	decigram dg	centigram cg	milligram mg
kilolitre kl	hectalitre hl	decalitre dal	litre ℓ	decilitre dl	centilitre cl	millilitre ml



Each unit is 10 times bigger than the one to the right

Each unit is 10 times smaller than the one to the left

Kilo means 1000 times bigger

hecta means 100 times bigger

deca means 10 times bigger

milli means 1000th part

centi means 100th part

deci means 10th part

Not all the units are in everyday use. The ones we use most are marked boldly in the table above. They are:

length - metre m, centimetre cm, millimetre mm, kilometre km.

weight - gram g, milligram mg, kilogram kg (known as a 'kilo')

capacity - litre ℓ, millilitre ml.

Very large weights are measured in **tonnes** (sometimes called metric tonnes)

1 tonne = 1000 kilograms.

Going Metric

Britain is changing from the old system of measuring (called the "Imperial" system) to the metric system.

This means that many items that you buy in shops are no longer sold in pounds and ounces, yards, feet and inches, gallons and pints but in metric measurements.

Usually the manufacturers change to the nearest round figure so that an 8 ounce pack of butter is phased out and a 250 gram pack replaces it. The 250 gram pack contains a little more butter, so it costs a little more. Sugar is sold in 1 kilogram bags, replacing the old 2 lb bags and again there is more sugar in the metric pack, so it costs more.

Note: we say 'kilo' instead of kilogram but all the other metric measures are said in full.

Instead of yards of material, shops are now selling metres, and you need to know your measurements in centimetres and your weight in kilograms.

Distances between places will be measured in kilometres and since a kilometre is shorter than a mile this means that it will sound further from London to Brighton in kilometres (80.45) than it does in miles (50). Obviously the actual distance doesn't change and it's important to remember the two systems of measurement are just two different ways of saying the same thing.

It's not necessary to convert from one system to the other, it's far better to 'think metric', though of course this is easier said than done if you have grown up with the old measurements.

It may help you to get a rough idea of the way the two systems work if you remember these lines:

A metre measures three foot three, it's longer than a yard, you see.

A litre of water's a pint and three quarters.

Two and a quarter pounds of jam weigh about a kilogram.

If you want to convert from one system to the other exactly you need to use a conversion table like the one in this section.

Metric Conversion Table

Length:

1 millimetre	=	0.03937 inch
1 centimetre	=	0.3937 inches
1 metre	=	1.0936 yards
1 kilometre	=	0.6214 mile
1 inch	=	2.54 centimetres
1 foot	=	30.48 centimetres
1 yard	=	0.9144 metres
1 miles	=	1.6093 kilometres

Weight:

1 gram	=	0.0353 ounces
1 kilogram	=	2.2046 pounds
1 tonne	=	0.9842 ton
1 ounce	=	28.35 grams
1 pound	=	0.4536 kilogram
1 stone	=	6.3504 kilograms
1 ton	=	1.0161 tonnes

Capacity:

1 litre	=	1.75985 pints or 0.22 gallon
1 pint	=	0.5683 litre
1 gallon	=	4.561 litres

You will probably need a calculator to work out these conversions:

1. How many metres in 10 yards?
2. How many pounds in 5 kilograms?
3. How many yards in 100 metres?
4. How much do you weigh in kilograms?
5. How tall are you in metres?

Units of Measurement

Write down some things that we used to measure in:

yards

pounds (lb)

pints

inches

gallons

ounces

miles

tons

We now measure in metric units.

These are:

millimetres mm

litres ℓ

grams g

metres m

centilitres cl

kilograms kg

kilometres km

centimetres cm

millilitres ml

Which measures length?

Which measures quantities of liquid?

Which measures weight?

Which is bigger - a metre or a centimetre?

a litre or a centilitre?

a gram or a kilogram?

a millilitre or a centilitre?

a millimetre or a metre?

Fill in the missing numbers:

1. There are centimetres in one metre
cm = 1 m
2. There are centilitres in one litre
cl = 1 ℓ
3. There are metres in one kilometre
m = 1 km
4. There are grams in one kilogram
g = 1 kg
5. There are millimetres in one metre
mm = 1 m
6. There are millimetres in one centimetre
mm = 1 cm
7. There are millilitres in one litre
ml = 1 ℓ

Look at these words:

Century,

cent,

percentage,

centigrade,

centipede,

centenary.

Which number do they all refer to?
Explain how.

Units of Measurement

Look again at your list of things.

Write next to them the **metric** units we measure them in now.

Which metric units would you use to measure these things? (Use a tape measure to help you with some and collect the labels from things you buy).

screws	knitting wool
curtain materials	speed of a car
milk	spanners
sugar	a spoonful of medicine
tea	the size of a piece of paper
the distance from London to Leeds	petrol
the height of a building	bottle of lemonade
your weight	how much water a bucket can hold
clothes size	waist measurement
potatoes	how much sand a bucket can hold

Weights and Measures (Imperial)

Fill in the gaps:

1. There are.....ounces in 1 lb
2. There are.....inches in 1 foot
3. There are.....lbs in 1 cwt
4. There are.....fluid ounces in 1 pint
5. There are.....feet in 1 yard
6. There are.....inches in 1 yard
7. There are.....lbs in 1 stone
8. There are.....yards in 1 mile
9. There are.....pints in 1 gallon
10. There are.....cwt in 1 ton

Weights and Measures (Metric)

Fill in the gaps:

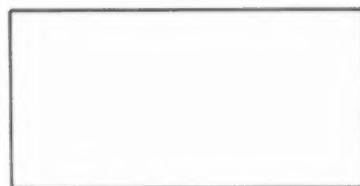
1. There are.....grams in 1 kilogram
2. There are.....centimetres in 1 metre
3. There are.....millilitres in 1 litre
4. There are.....metres in 1 kilometre
5. There are.....milligrams in 1 gram
6. There are.....litres in 1 kilolitre
7. There are.....millimetres in 1 metre
8. There are.....centilitres in 1 litre
9. There are.....decilitres in 1 litre
10. There are.....kilograms in 1 metric tonne

Measure these Lines

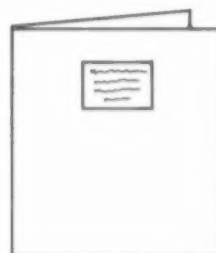


Use the Tape Measure to Measure these Things

The table top



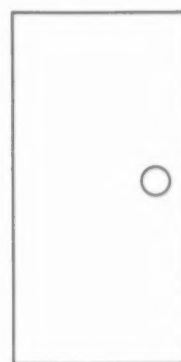
Your book



Your pen or pencil



The door of the room



The length of your arm



The span of your hand



The length of your foot



Vital Statistics - Women

Put these words on the right lines:

waist

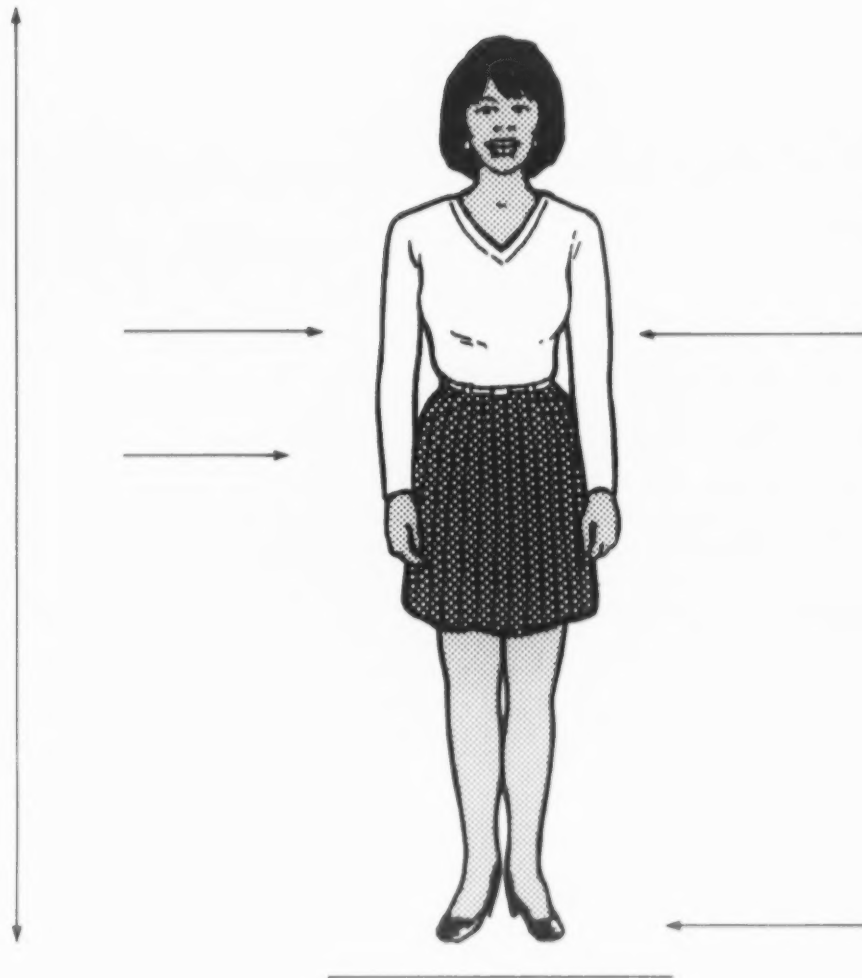
shoe-size

weight

height

bust

hips



Height _____

Waist _____

Weight _____

Hips _____

Bust _____

Shoe-size _____

Vital Statistics-Men

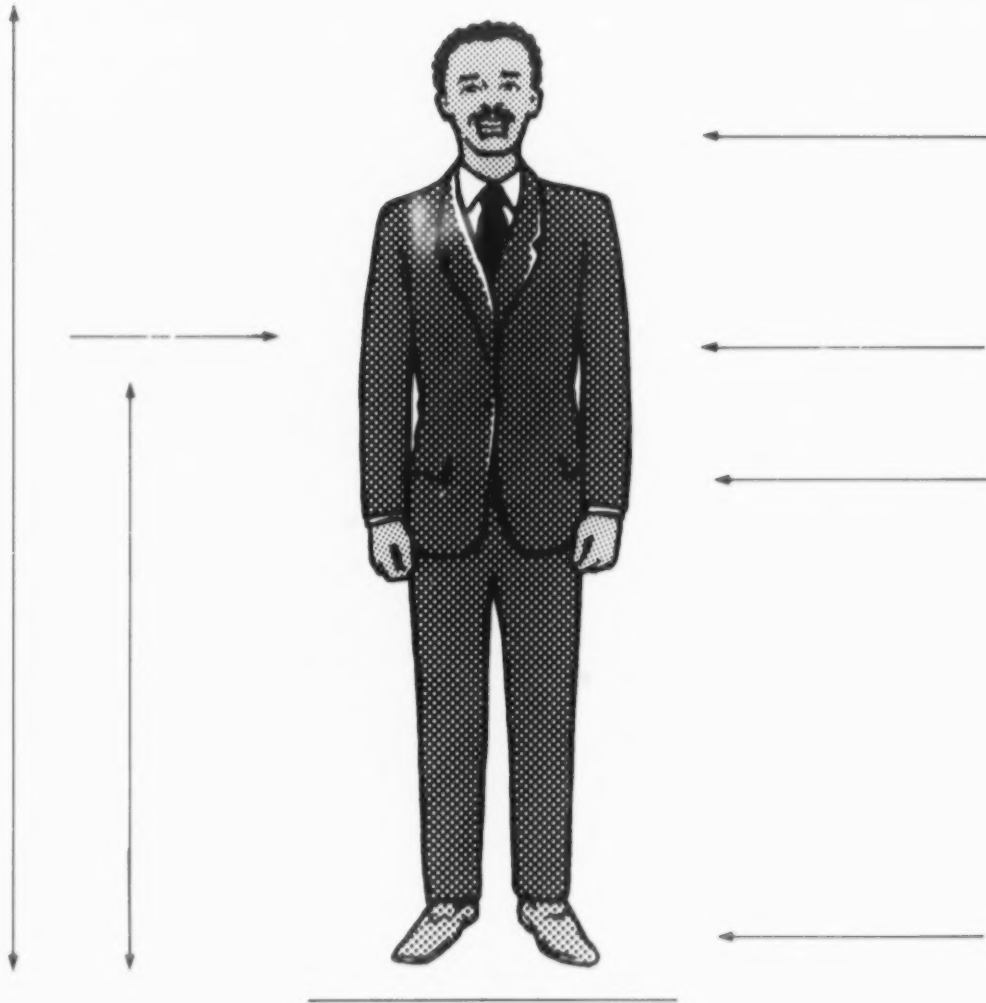
Put these words on the right lines:

height
inside-leg

weight
collar-size

shoe-size
waist

chest
hips



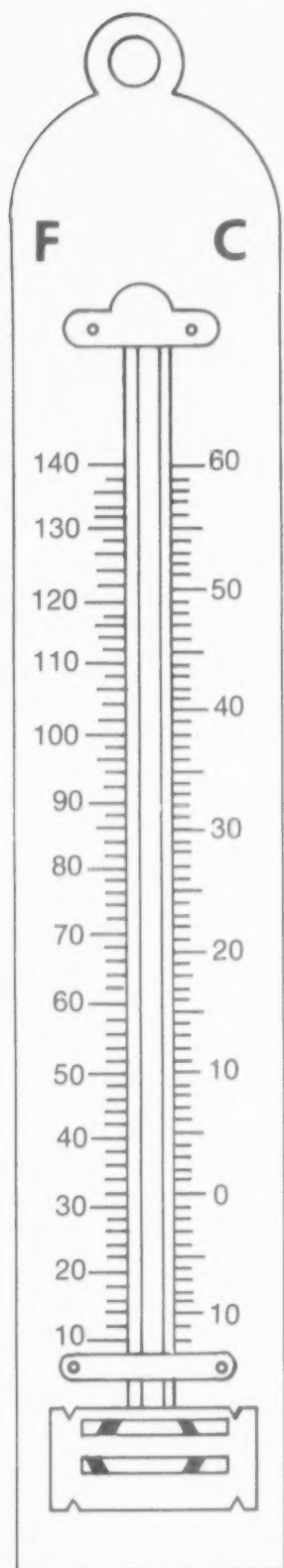
Height _____ Waist _____

Weight _____ Hips _____

Collar-size _____ Inside-leg _____

Chest _____ Shoe-size _____

Reading the Thermometer



The scale on a thermometer is marked in degrees Centigrade or Celsius and Fahrenheit.

To find out what the marks mean on the scale count the spaces in between 2 marked numbers.

For example, on the Fahrenheit scale there are 5 spaces to show 10 degrees. So each space between the marks is 2 degrees.

On the Centigrade or Celsius scale there are 10 spaces to show 10 degrees, so each space between the marks is 1 degree.

The freezing point of water is 0°C or 32°F

The boiling point of water is 100°C or 212°F

Match Them Up

oz	stone	in	square feet
km	foot	g.	miles per hour
cwt	centimetre	hp	gallons
lb	yard	a.m.	miles per gallon
ft.	pound	p.m.	horse power
cm	metre	m.p.h.	square centimetres
yd	hundredweight	sq. ft.	morning
st	kilogram	cm ²	afternoon and evening
kg	kilometre	gal	inch
m	ounce	m.p.g.	grams

% minus, take away

+

pound

=

divided by

-

plus, add

×

inch

÷

per cent

/

equals

"

multiplied by, times

£

feet

Match Them Up

$\frac{1}{2}$	a half	pt	minutes
$\frac{3}{4}$	a quarter	tsp	regulo (gas)
$\frac{1}{2}$	a third	tbsp.	litre
$\frac{1}{3}$	three quarters	$^{\circ}\text{C}$	hours
$\frac{1}{8}$	five eighths	$^{\circ}\text{F}$	teaspoon
$\frac{3}{8}$	an eighth	ℓ	tablespoons
$\frac{5}{8}$	three eighths	fl. oz.	degrees centigrade/Celsius
.	and	Reg.	fluid ounces
()	decimal point	hr.	degrees Fahrenheit
&	brackets	min.	pints

mm

cubic feet

sq in

metre

cc.

square inch

sq. yd.

cubic centimetre

cu. ft.

square yard

m.

millimetre

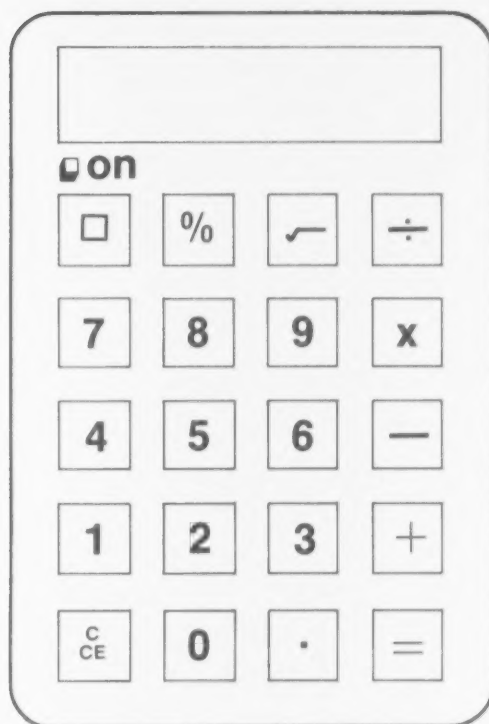
km.

litre

ℓ

kilometre

Using The Calculator



Calculators take the effort out of adding up, taking away, multiplying and dividing.

Most calculators can work out percentages and square roots as well, and, generally, the more expensive a calculator is the more sophisticated it is likely to be, and the more operations it should be able to do.

When buying a calculator for your own use, decide what you are going to use it for. There's no point in having a calculator with lots of buttons on it that you never use.

A calculator will always give you the right answer **if** you know how to use it. You need to be able to do two things to get the best out of your calculator:

1. Know how to put a sum into the calculator, in other words, which buttons to press and in what order.
2. Know how to see through to the maths in a problem you come across in daily life. In other words how to find the sum that needs an answer.

1. How to put the sum in:

suppose the sum is $35 + 27$

You just press the button marked 3, then the one marked 5, then + then 2, then 7, then =. The number that comes up on the display will be the answer.

You do exactly the same with take away, multiply and divide sums, write them down as you would say them, try it with these:

$$28 - 16 =$$

$$19 \times 5 =$$

$$306 \div 9 =$$

$$268 \times 45 =$$

Using The Calculator

The questions we need to answer are: How much carpet do we need and how much will it cost?

This is particularly important when calculating with money or any other numbers with a decimal point. Make sure you get the decimal point in the right place, or your answer could be 10 or 100 times too big or too small.

Try these sums with decimals:

$$£12.50 + £306.20 =$$

$$48.02 \times 13 =$$

$$£46.23 - £13.95 =$$

$$11.65 \times 7 =$$

$$£60.00 \times 8 =$$

$$98.03 + 16.5 =$$

$$£96 \div 12 =$$

$$12.01 \div 3.2 =$$

Remember: $\frac{1}{2}p$ is 0.5p or £0.005

Now try these:

$$£0.15\frac{1}{2} \times 28.06 =$$

$$£45.02\frac{1}{2} + £19.36\frac{1}{2} =$$

$$£2.50 - £0.75\frac{1}{2} =$$

$$£890.07\frac{1}{2} + £96.90 =$$

2. Seeing through to the maths

This is one of the most important skills to develop, it's no good knowing how to operate the calculator but not knowing what sum you ought to be feeding into it. Use common sense and don't panic and you'll find that most of the problems you come up against in everyday life that can be solved mathematically are nowhere near as complicated as they look. Think clearly, ignore any unnecessary information and try to see what is really important and what is just confusing.

For example, you decide to buy a new carpet for the living room so you go to the showroom and see dozens of different carpets all at different prices and of different qualities. There's nowhere to sit down quietly and work out what you want and what you can afford, and the salesman seems to think you are just about to buy the most expensive carpet in the shop.

Decide which two or three carpets you really do prefer, then go home and work out how much each would cost you with the aid of the next sheet.

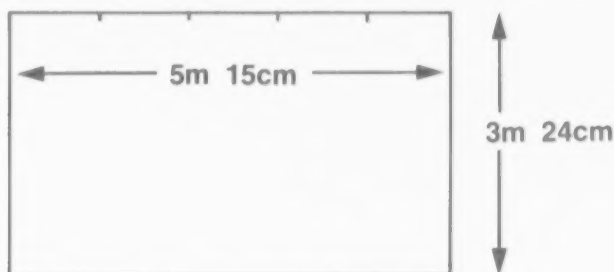
Carpeting a Room

The questions we need to answer are: How much carpet do we need and how much will it cost?

Using a calculator will make the sums easier.

First, we must measure the room. Draw a rough plan and mark the measurements from wall to wall, using a metre stick or a tape measure.

Say the room looks like this:



The length is 5m 15cm = 5.15m

The width is 3m 24cm = 3.24m

Now find the **area of the floor** - this tells us how much carpet we will need. First make a guess by rounding off the measurements to whole numbers.

We must convert the measurements to metres, as carpet is measured and priced by the square metre.

We multiply length by width to find the area. Rough guess: $5 \times 3 = 15$

Use the calculator to find the exact answer:

$$5.15 \times 3.24 = 16.686$$

This figure is **square metres** (metres $\times$ metres)

Now we must round off this figure to something sensible as the shop will not be able to sell us 0.686 of a metre - we'll call it 16.7.

Having chosen a carpet, find the price - say it costs £3.36 per sq metre.

Now multiply 16.7 sq m by £3.36 per sq m. (Guess first)

$$16.7 \times 3.36 = 56.112$$

The answer is a sum of money, so we round off to 2 decimal places to give £56.11 which will be the cost of our carpet.

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Diana Coben and Sandy Black
1984

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ISBN 0 906509 53 X